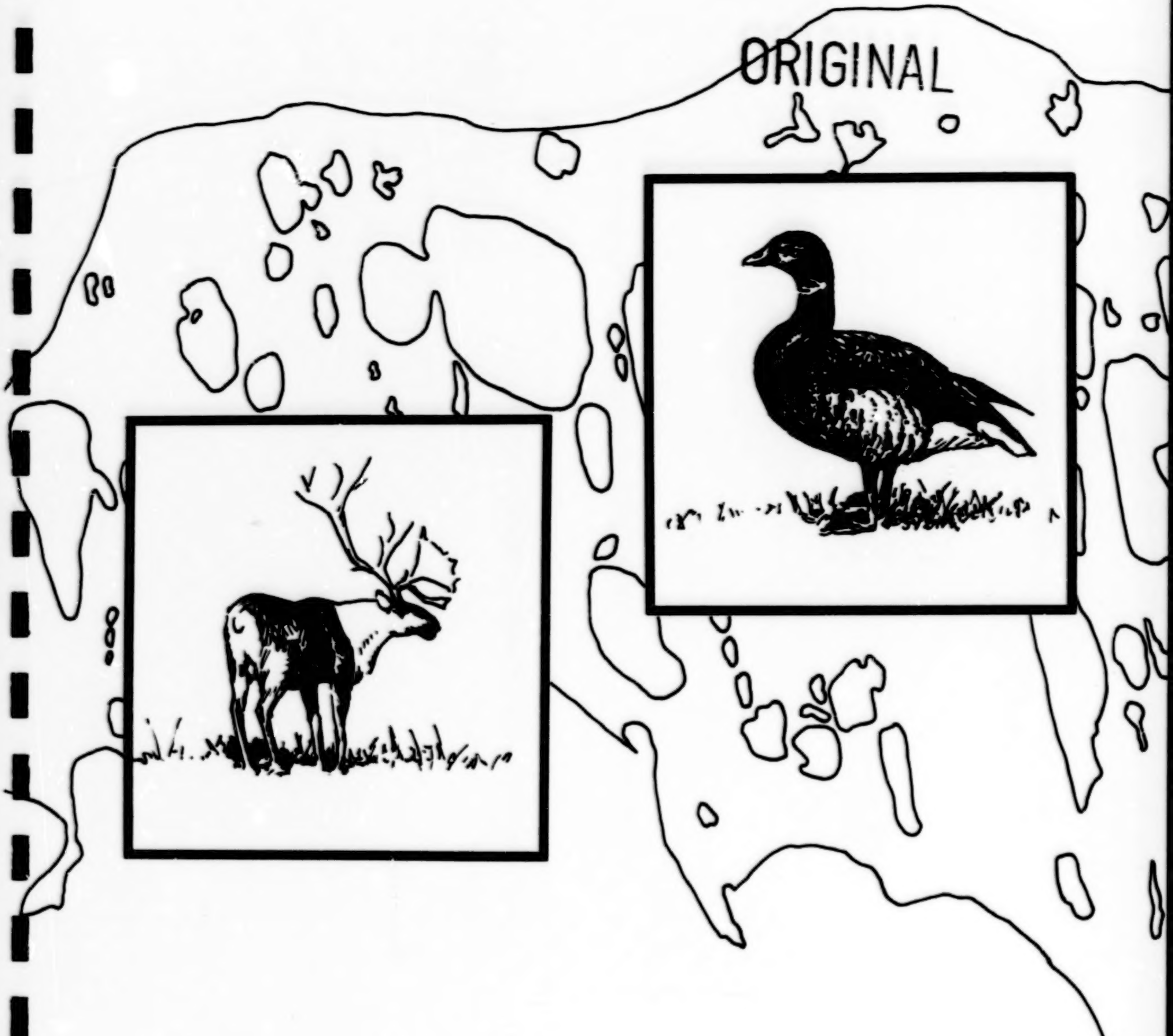
AUG 11 '86
631
COMPLETED
224
I 53.2:T28/habitat

BLM-AK-PT-85-

Teshekpuk Lake Special Area Study

Habitat Evaluation

ORIGINAL



Bureau of Land Management, September 1, 1985

HABITAT EVALUATION
For

Teshekpuk Lake Special Area Study

Jack Mellor, Project Manager

FINAL

Compiled and Edited by

James B. Silva

with sections compiled by

Layne G. Adams and Robert Gal

September 1, 1985

PREPARED BY

BUREAU OF LAND MANAGEMENT
ARCTIC RESOURCE AREA
FAIRBANKS DISTRICT
FAIRBANKS, ALASKA

Carl D Johnson

DISTRICT MANAGER

BEST COPY AVAILABLE

TABLE OF CONTENTS

Page

Executive Summary iv
List of Tables vi
List of Figures vii
List of Appendices viii
List of Acronyms/Terms ix

Chapter 1 - Purpose of Action 1

Introduction 1
Authority and Legislative Directives 4
Management Goals and Objectives 4
Present Management 5
BLM Decision Process 6

Chapter 2 - Biological and Subsistence Values 9

Introduction 9
Land Status 9
Existing Ecosystem 10
Biological Values 12
  Waterbirds 12
    Existing Distribution and Habitat Use 12
      Habitats 12
      Avian Species Occurrence 12
    Priority Species 17
      Pacific Black Brant 17
      Canada Geese 23
      White-fronted Geese 26
      Lesser Snow Geese 29
    Other Species 31
      Ducks 31
      Tundra Swans 33
      Loons 34
      Shorebirds 34
    Discussion - Sensitivity to Impacts 35
      Oil and Gas Exploration Activities 35
      Oil and Gas Development Activities 37
    Important Habitats by Priority 43
      Goose Molting Habitat 43
      Coastal Wetland (Class VIII) 44
      Tundra Swan Nesting Habitat 44
      High Density Duck Habitats 48
      Wetland Habitats (Class II - VII) 48
    Waterbird Protective Measures 48

BEST COPY AVAILABLE

Page

Caribou 54
  Existing Distribution and Habitat Use 54
  Discussion - Sensitivity to Impacts 59
    Oil and Gas Exploration Activities 59
    Oil and Gas Development Activities 60
  Caribou Protective Measures 66

Subsistence Values 68
  Introduction 68
  Sources of Data 71
    Data Needs 71
    Available Literature 72
    New Data 73
  Subsistence Resources of the Teshekpuk Lake Special Area 75
    Access 79
    Fish 82
    Caribou 86
    Waterbirds 88
    Furbearers 90
    Historic Patterns 90
  Dynamics of Subsistence Use 92
    Methodological Considerations: Creating a Cultural Map 92
    Interpreting the Cultural Map 94
    Ayaqhaat: The Role of Social Networks 97
  Parameters for Protective Measures of Subsistence Resources 99

Chapter 3 - Summary of Protective Measures for Combined Values 103

Introduction 103
Combined Protective Measures for Biological and Subsistence Values 103
Study Needs 109

Chapter 4 - Scoping and Data Gathering Process 111

Public Meetings and Workshops 111
Habitat Evaluation Meetings 113

Chapter 5 - Comments on Draft Habitat Evaluation, June 1985 115

Individuals, Organizations and Government Agencies (Federal, State and Local) Who Commented on the Draft Habitat Evaluation 115
Generic Comments 117

Literature Cited 125

Page

Appendices 137

Appendix I - Authors and Participants 137
Appendix II - Lease and Permit Stipulations 139
Appendix III - Caribou/Waterbird Impact Analysis Workshop 147
Appendix IV - Land Status 149
Appendix V - Comments Received on the Draft Habitat Evaluation 153
Appendix VI - Maps - 1:250,000 183

Executive Summary

This Habitat Evaluation was prepared in cooperation with the U.S. Fish and Wildlife Service, the State of Alaska, the North Slope Borough, and other interested individuals (Appendix I). The HE provides maps and analyses of habitat values for comparison with potential oil and gas values mapped and analyzed in a separate Mineral Evaluation. These analyses will enable the best possible decisions for management of all values within the Teshekpuk Lake Special Area (TLSA).

The TLSA is part of the National Petroleum Reserve in Alaska (NPR-A), which is presently managed in accordance with the Record of Decision for the environmental impact statement on oil and gas leasing. The TLSA supports one of the most productive, diverse and sensitive wetland ecosystems in arctic Alaska. The area has international significance due to the presence of large numbers of migratory waterfowl. Compared with the rest of NPR-A the TLSA has approximately six times the average density of geese, five times the average for tundra swans, three times the average for shorebirds and twice the average for ducks and loons.

The most striking biological value of the TLSA is the use of the area north and east of Teshekpuk Lake (Figure 4) by an internationally significant assemblage of molting Pacific black brant, Canada, white-fronted and snow geese, which numbered over 58,000 birds in 1984. This area is the most significant known molting resort for non-breeding geese on the arctic coast of Siberia and North America. No other area of the Arctic Coastal Plain offers the extensive, nutrient-enriched, meadow-like habitats that support such large numbers of geese in association with deep, open lakes which provide security from predators during the molting period when the geese are highly vulnerable. Up to 23% of the world's Pacific black brant population, a species which is presently attracting a high degree of concern due to seriously declining population levels, has been documented as having used the area during the molting period. In addition to providing habitat for molting geese, the coastal wetlands (Figure 9) provide habitat during fall staging for large numbers of black brant (those molting locally and breeding populations to the east in arctic Alaska and Canada), Canada geese, ducks, swans, and shorebirds.

The TLSA is also of significant importance to the resident caribou herd. The estimated population of the Teshekpuk Caribou Herd is approximately 11,000 to 12,000 animals. The Teshekpuk Caribou Herd remains within the area year-round, and can be found in small groups scattered over most of the TLSA. During the spring calving period (May 15 - June 30) (Figure 14) and the insect relief period (July 1 - July 31) (Figure 15) most of the animals form large aggregations within important use areas. Caribou are more sensitive to disturbance during these aggregate periods, and any disturbance is more likely to have greater impacts during these times than during any other times of year.

At present there are no year-round human residents living within the TLSA. From the 1920s until the 1940s, two permanent communities (Qalluvik and Isuk) (Figure 16) were populated by reindeer herders and their families. These families earned their livelihood by fishing, trapping, seal and caribou hunting in addition to looking after their reindeer herds. Some of these families now reside in nearby communities such as Barrow, Nuiqsut and Atqasuk. Portions of this zone are used, primarily by the residents of Barrow and secondarily by the residents of Nuiqsut and Atqasuk, for fishing, hunting and trapping. Subsistence fishing is the primary activity and uses are heaviest during the spring and summer months, but general use occurs on a year-round basis. Presently capital improvement projects have put many subsistence users into full-time jobs. However, most of these individuals feel that when these jobs are gone, they will range more widely for subsistence resources and use areas of known high potential such as the Teshekpuk Lake area.

Waterbird, caribou and fisheries values, in association with subsistence opportunities, make the TLSA stand out as one of the most significant wildlife habitats in arctic Alaska. The TLSA has been divided into three zones based on biological and subsistence use values and their sensitivity to oil and gas-related activities (Figure 24).

Zone 1 is the most sensitive and crucial of the three zones. Zone 1 contains 467,000 acres, of which 217,000 acres were deleted from oil and gas leasing by the Record of Decision (ROD) for the Final Environmental Impact Statement on Oil and Gas leasing in the National Petroleum Reserve in Alaska (Figure 3). The ROD identified criteria that would have to be met prior to any leasing occurring within this deleted area. This Habitat Evaluation has not demonstrated that these conditions have been met, and if the concurrent Minerals Evaluation does not demonstrate that the conditions will be met, the 217,000 acres will continue to be deleted from leasing considerations until such time as the ROD criteria are met. Based on the sensitivity of black brant and other waterfowl species during molting and staging, and caribou during calving, allowing any activity that is not in compliance with those protective measures outlined in Chapter 3 would result in impacts that could alter the present use of the area by waterfowl and other wildlife species. The measures outlined in Chapter 3, which would protect these crucial biological values, could make oil and gas activities very difficult to conduct and/or preclude them as they are presently conducted on the North Slope.

Zone 2 contains biological and subsistence use values which fall between Zone 1 and Zone 3. Although this zone does not support as high a concentration of biological values as found in Zone 1 it does have high subsistence use, and fairly strict measures are necessary to protect values significantly higher than exist in much of the adjacent NPR-A coastal plain. If oil and gas leasing is justified, specific stipulations could be developed to help minimize impacts.

Zone 3 constitutes the remainder of TLSA. Although biological values and subsistence uses are still important within Zone 3, applicable lease and permit stipulations presently utilized in permitting activities within NPR-A could, for the most part, be applied to help minimize disturbances.

LIST OF TABLES

TABLE		PAGE
1	Wetland Habitat Classes	13
2	Geese Observed during Molting Season on Lakes North and East of Teshekpuk Lake, NPR-A, Alaska	15
3	Percentage of Pacific Black Brant Population Molting on Lakes North and East of Teshekpuk Lake, Based on Mid-July Aerial Surveys	22
4	Use of Wetland Classes by Important Waterbird Species and Groups within the Teshekpuk Lake Special Area, NPR-A, Alaska	50
5	Caribou Response to Aircraft	64
6	Persons Interviewed at Workshops in Barrow, Atqasuk and Nuiqsut, Alaska	74
7	Association of Allotment Owners with Teshekpuk Lake Special Area	76
8	Family and Individual Names Associated with Sub-areas of the Teshekpuk Lake Special Area (Figure 17)	77

LIST OF FIGURES

FIGURE		PAGE
1	National Petroleum Reserve in Alaska (NPR-A) & Study Area within Alaska	2
2	Teshekpuk Lake Special Area	3
3	Special Management Zone and Deleted Area	7
4	Goose Molting Area	14
5	Black Brant Densities and Distribution	21
6	Canada Geese Densities and Distribution	25
7	White-fronted Geese Densities and Distribution	28
8	Snow Geese Densities and Distribution	32
9	Coastal Wetlands	45
10	Shorebird Habitat	46
11	Swan Habitat	47
12	Duck Habitat	49
13	Waterbird Values	51
14	Caribou Calving	56
15	Caribou Insect Relief Areas	58
16	Native Allotments	69
17	Native Names and Uses of the Area	70
18	Subsistence Use Access	80
19	Subsistence Fishing	83
20	Subsistence Caribou Hunting	87
21	Subsistence Goose Hunting	89
22	Subsistence Trapping	91
23	Subsistence Opportunities	95
24	Summary of Protective Measures for Combined Values	104
25	Phase 1 Waterbird Working Group Recommendation	124
26	Caribou/Waterbird Workshop Recommendations	148

LIST OF APPENDICES

APPENDIX		PAGE
I	Authors and Participants	137
II	Lease and Permit Stipulations	139
III	Summary of Caribou/Waterbird Workshop (Gilliam and Lent 1982)	147
IV	Land Status	149
V	Comments Received on the Draft Habitat Evaluation	153
VI	Maps (1:250,000) Map 1 - Land Status Map 2 - Waterbirds Map 3 - Caribou Map 4 - Subsistence	183

LIST OF ACRONYMS/TERMS

ADF&G	Alaska Department of Fish and Game
AGL	Above Ground Level
ANILCA	Alaska National Interest Lands Conservation Act
AO	Authorized Officer
ASRC	Arctic Slope Regional Corporation
BLM	Bureau of Land Management
c 1950	Circa (around that time period)
CAH	Central Arctic Caribou Herd
EIS	Environmental Impact Statement
EPO	Environmental Protection Office of the North Slope Borough
FWS	U.S. Fish and Wildlife Service
HE	Habitat Evaluation
HMP	Habitat Management Plan
Inupiat Office	Commission on History, Language, and Culture
m	Meter
MOU	Memorandum of Understanding
NPR-A	National Petroleum Reserve in Alaska
NSB	North Slope Borough
PET-4	Naval Petroleum Reserve Number 4
PL	Public Law
ROD	Record of Decision for the Environmental Impact Statement on oil and gas leasing in the National Petroleum Reserve in Alaska
TAPS	Trans Alaska Pipeline System

TH	Teshekpuk Lake Caribou Herd
TLSA	Teshekpuk Lake Special Area
TLUI	Traditional Land Use Inventories
Unlanded	Without Native Allotments
USGS	U.S. Geological Survey
USSR	Union of Soviet Socialist Republics
WAH	Western Arctic Caribou Herd

BEST COPY AVAILABLE

CHAPTER 1

PURPOSE FOR ACTION

I INTRODUCTION

This Habitat Evaluation (HE) is being prepared for Phase 1 of the Teshekpuk Lake Special Area Study to update and illustrate surface resource values. The Teshekpuk Lake Special Area Study is being developed for an area designated by the Secretary of the Interior in 1976 as the Teshekpuk Lake Special Area (TLSA) (Figure 1 and 2). This is the first Special Area Study within the National Petroleum Reserve in Alaska. It is an effort to map, analyze and weigh specific surface resource values in relation to potential subsurface values. This will allow the best possible decisions for management of all values within the TLSA consistent with Congressional intent mandated in Public Law 94-258, Naval Petroleum Reserves Production Act and PL 96-514, Department of the Interior Appropriation Act. There will be four phases involved within the Teshekpuk Lake Special Area Study.

Phase 1 will concurrently, produce a Habitat Evaluation and a Minerals Evaluation by September 1, 1985. These evaluations will update and illustrate surface and subsurface values geographically and will propose mitigative criteria, all of which will be analyzed in Phase 2.

Phase 2 will analyze the biological values in relation to potential oil and gas values. After weighing these values, the District Manager will make geographic recommendations or alternatives for areas to be protected from development activities, and for areas to be offered for lease along with the appropriate stipulations, for those areas.

Phase 3 will reach final decisions by the BLM State Director, after consultation with representatives of other agencies, that identifies areas available for leasing by October 30, 1985. He will also select a framework of mitigative stipulations which may be applied to any action or activities which would adversely affect important or crucial biological or subsistence values within the TLSA.

Phase 4 will develop a Habitat Management Plan (HMP) outlining the decisions from Phase 3 which will be completed by February 1986.

The Teshekpuk Lake Special Area is presently managed in accordance with the Record of Decision for the Environmental Impact Statement on oil and gas leasing in the National Petroleum Reserve in Alaska.

This HE will identify the sensitivity of different wildlife species to impacts associated with oil and gas exploration and development and relate this to geographic locations. In addition, the HE will identify to what degree subsistence uses are compatible with oil and gas activities. Protective measures for the biological resources and subsistence uses within the TLSA will be recommended.

BLANK PAGE

BLANK PAGE

BLANK PAGE

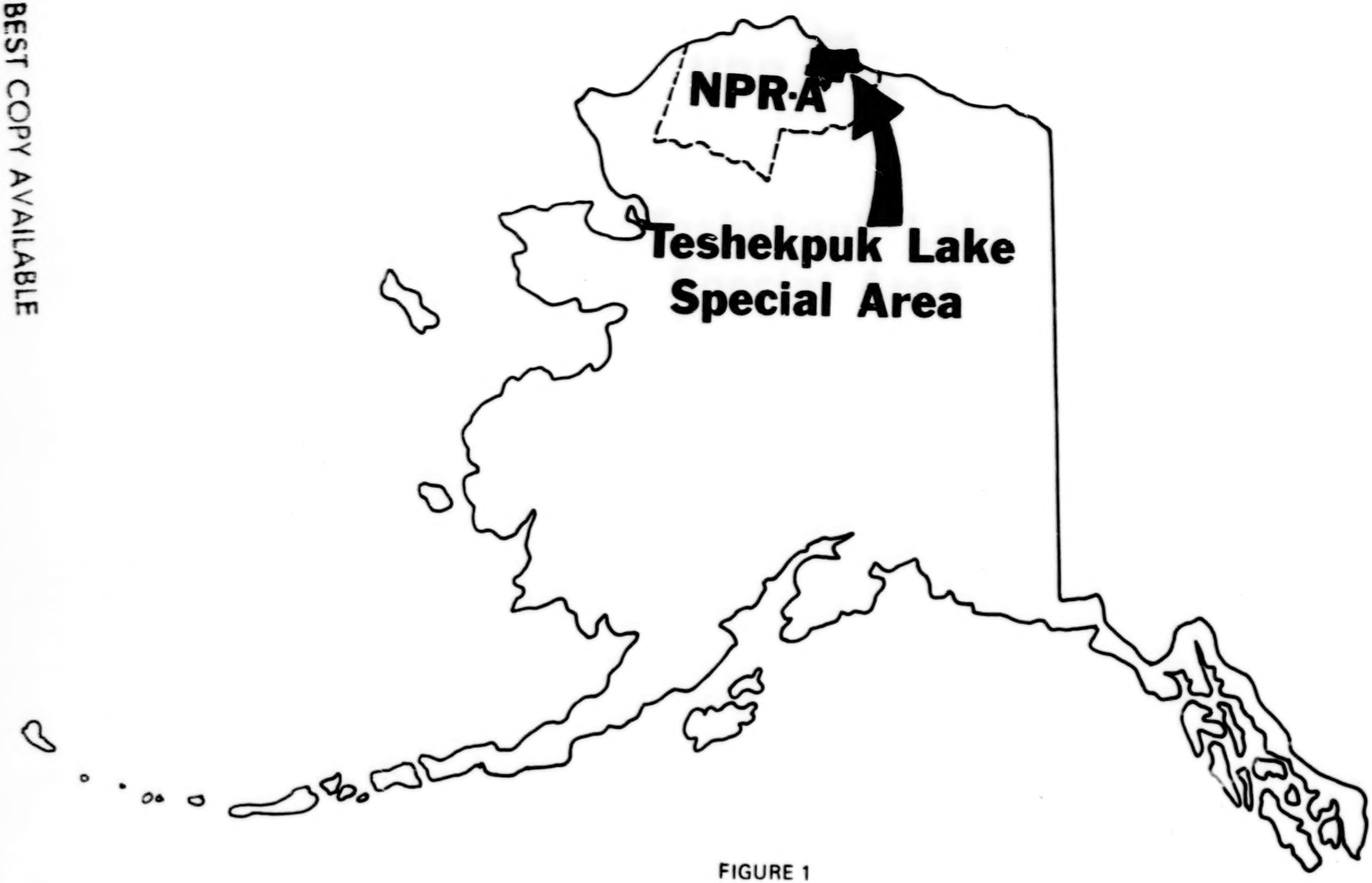


FIGURE 1

NATIONAL PETROLEUM RESERVE IN ALASKA (NPR-A) & STUDY AREA WITHIN ALASKA

3

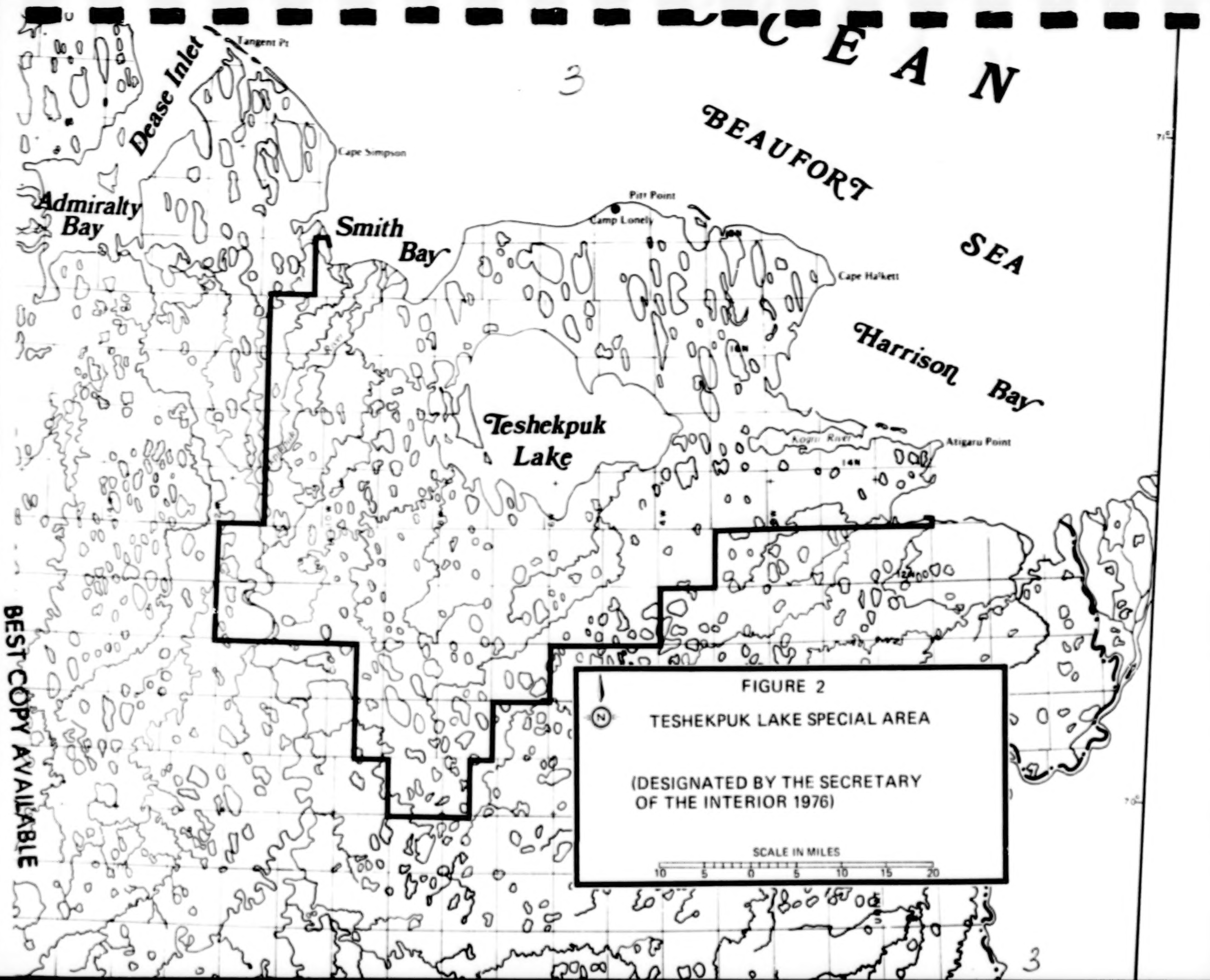


FIGURE 2

TESHEKPUK LAKE SPECIAL AREA

(DESIGNATED BY THE SECRETARY OF THE INTERIOR 1976)

3

The Bureau of Land Management will gather information and analyze values cooperatively with the U.S. Fish and Wildlife Service, State of Alaska, North Slope Borough, and other interested groups and individuals.

II. AUTHORITY AND LEGISLATIVE DIRECTIVES

This HE is being prepared in accordance with Public Law (PL) 96-514, Appropriations Act of 1981, and PL 94-258, the National Petroleum Reserves Production Act of 1976. PL 94-258 required the Secretary of the Interior to conduct a petroleum exploration program within NPR-A. The Secretary was further required to conduct this exploration program, in a manner which would assure the maximum protection of important surface values within special areas such as, the Teshekpuk Lake Area, to the extent consistent with the requirements of the act for the exploration of the reserve. PL 96-514 mandated the BLM to develop an expeditious oil and gas leasing program while mitigating any reasonably foreseeable and significantly adverse effects on the surface values within NPR-A. In addition, subsistence values will be considered as directed by Section 810 of the Alaska National Interest Lands Conservation Act, PL 96-487. It also incorporates the cooperative analysis of values completed by federal, State and local agencies addressed within the Record of Decision on Oil and Gas Leasing and Development in the National Petroleum Reserve in Alaska.

BLM is preparing this HE in cooperation with the FWS under a Memorandum of Understanding (MOU) signed June 19, 1984, and with the State of Alaska under an MOU signed August 20, 1984.

III. MANAGEMENT GOALS AND OBJECTIVES

This HE, as part of Phase 1 of the Teshekpuk Special Area Study, will provide geographic data for important wildlife species and subsistence uses within the TLSA for evaluation of these values relative to subsurface values. The Phase 2 follow-up analysis will weigh biological values with oil and gas values so that recommendations can be made for lease stipulations, locations of areas for leasing and development, locations of areas to be protected and determining resources that need further study. The Phase 3 portion of the study will be management decisions made by the BLM State Director as per the analysis and recommendations made in Phase 2. Within this framework, there are several specific Habitat Evaluation goals and objectives.

A. Goals

1. To evaluate important wildlife species, including their habitats and subsistence uses of those species.

2. To delineate wildlife and subsistence values geographically.

3. To identify specific measures according to geographic values and sensitivities, to help protect and maintain important or crucial wildlife habitats and subsistence uses.

BEST COPY AVAILABLE

B. Objectives

1. To identify important or crucial waterbird (particularly black brant) molting, staging and nesting habitat.

2. To identify important or crucial caribou habitat, such as calving grounds, insect relief areas and migration routes.

3. To protect and maintain this unique arctic ecosystem by developing protective measures for minimizing any disruptive activity affecting the long-term biological resource values of the area.

4. To recommend specific measures for protecting biological and subsistence values from oil and gas exploration, development and related activities within the TLSA. In some circumstances, a severe limitation on oil and gas leasing or related development activities may be necessary for the protection of sensitive habitats and priority species of wildlife.

5. To develop a cooperative, long-term inventory, study and monitoring program with the State of Alaska, North Slope Borough and U.S. Fish and Wildlife Service. This would be accomplished if additional data were needed to enhance the management of TLSA in relation to development allowed within this important ecosystem.

The priority species within this study are waterbirds (particularly black brant) and caribou. Other goose species that will be specifically evaluated are white-fronted, Canada and snow geese. If other species are found to be significant during the draft review process they will be addressed in more detail. Considerable emphasis will be placed on delineating areas by priority, such as by animal density or habitat sensitivity, so managers can establish varying levels of risk within a geographic location for an action or activity. An HMP will be prepared utilizing decisions made from this analysis in addition to addressing other relevant issues such as land exchanges.

In analyzing impacts on wildlife populations within the TLSA, it is impossible to give precise demographic or population change predictions of what might result from a broad range of potential development actions. Instead, this Habitat Evaluation will identify the sensitivity of different wildlife species to various types of impacts from oil and gas exploration and development activities. In addition, proposed oil and gas activities will be analyzed to determine the degree to which they would be compatible with subsistence activities. Protective measures will then be identified for both the biological resources and the subsistence uses of the area.

IV. PRESENT MANAGEMENT

The Teshekpuk Lake Special Area Study continues the effort to determine the best methods of managing resource values within NPR-A. It uses past legislative direction coupled with a series of Environmental Impact Statement decisions and study findings.

The National Petroleum Reserve in Alaska, was withdrawn as the Naval Petroleum Reserve Number 4 (PET-4) in 1923. PET-4 was under the jurisdiction of the U.S. Navy from 1923 until 1976, when management was transferred to the Secretary of the Interior and its name was changed to the National Petroleum Reserve in Alaska. The U.S. Geological Survey (USGS) was assigned exploration responsibilities, while the BLM was given management responsibility for the surface values. In 1977, during the section 105(c) multiple resource evaluation studies (mandated by PL 94-258), the Secretary of the Interior designated three Special Areas within NPR-A due to their significant subsistence, recreational and fish and wildlife values. These special areas were the Teshekpuk Lake, Utukok Uplands and the Colville River. In 1983 the BLM completed an Environmental Impact Statement on Oil and Gas Leasing in the National Petroleum Reserve in Alaska. The ROD for the Environmental Impact Statement further described these special areas by identifying zones within each area for the specific protection of significant subsistence uses and fish and wildlife values.

The ROD established two management areas (Figure 3) within the TLSA. The first designation of the ROD, deleted from the oil and gas leasing program approximately 217,000 acres in an area northeast of Teshekpuk Lake until at least one of the following conditions is met in the future:

- studies show the area is no longer critical to the life cycles of caribou and black brant;

- analogous situations demonstrate a high degree of compatibility of calving caribou and molting black brant with oil and gas activities; or

- new resource estimates and Department of the Interior directives establish that potential oil and gas values outweigh potential environmental losses.

In analyzing the information gathered through the Habitat Evaluation process, the deleted area is still considered crucial habitat for black brant and caribou. In addition, there has been no data to show that there is a high degree of compatibility between caribou calving and molting black brant with oil and gas activities. If the concurrent Minerals Evaluation does not demonstrate that the above conditions are met, the 217,000 acres will continue to be deleted from leasing considerations until such time as the ROD criteria are met.

The second ROD designation established a 750,000 acre Special Management Zone which includes the Beaufort Sea coastline, down to and surrounding Teshekpuk Lake (Figure 3). To protect crucial resource values, a special Design Solution stipulation (Appendix II) was developed for the Special Management Zone which allows oil and gas activities to occur only after sufficient studies of cumulative impacts have determined that the proposed activity would not significantly impact the identified resource values. Through analysis of the habitat values described in this HE recommendations developed in Phase 2 may modify this zone.

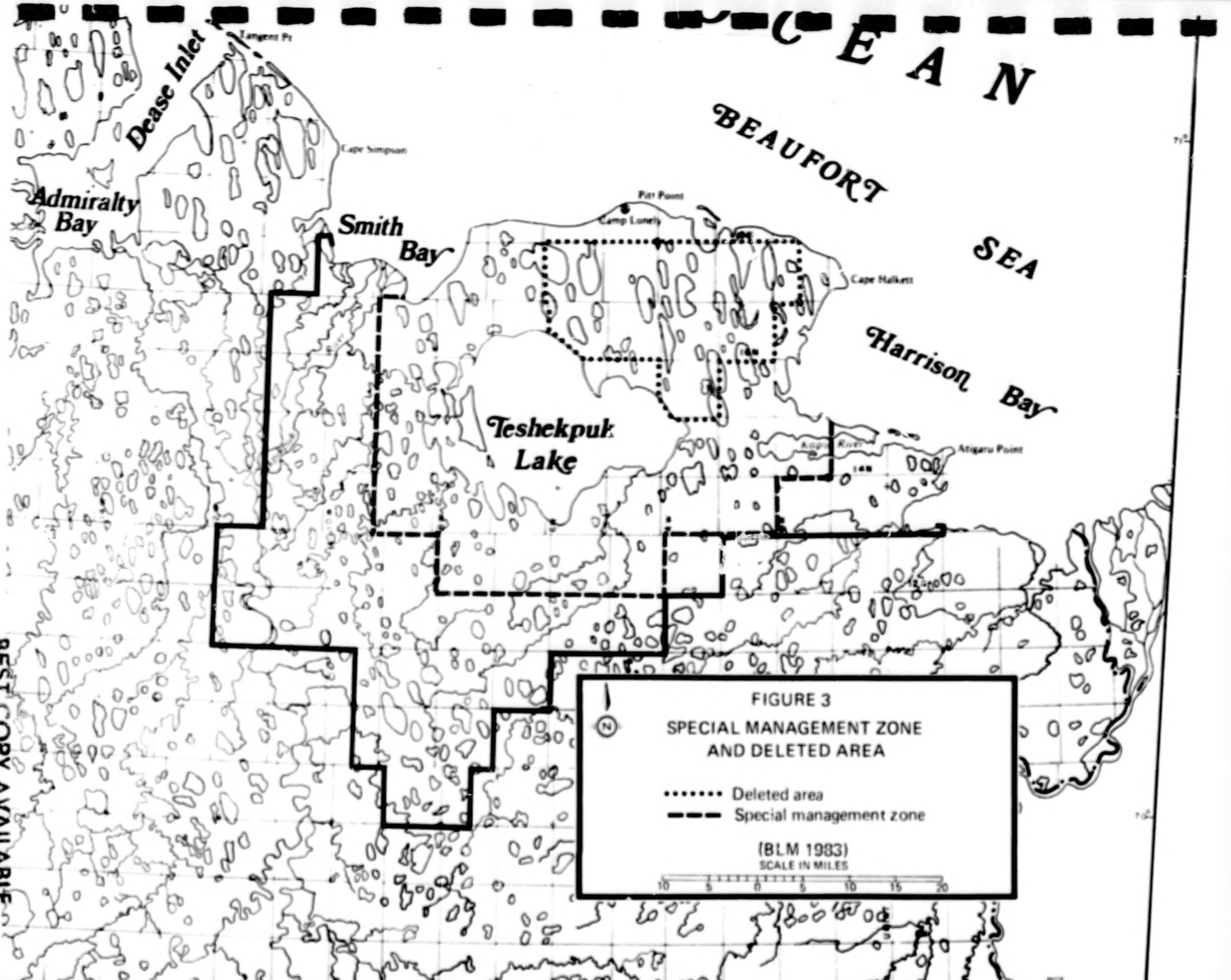


FIGURE 3
SPECIAL MANAGEMENT ZONE
AND DELETED AREA

(BLM 1983)

V. BLM DECISION PROCESS

This Habitat Evaluation and the separate Minerals Evaluation will provide a specific, up-to-date analysis of biological and mineral values within this area of known high biological values and predicted high oil and gas values. The analysis of this data in Phase 2 will enable the best-possible leasing or permitting decisions to be made within the TLSA. The geographic prioritization of specific biological and mineral values identified will continue to be used for management decisions beyond the initial leasing decision.

The BLM, in cooperation with other agencies, groups and individuals, is attempting to evaluate both the mineral and wildlife resource values within the TLSA at the highest level of specificity available to BLM to date.

CHAPTER 2

BIOLOGICAL AND SUBSISTENCE VALUES

I. INTRODUCTION

The BLM is preparing this Habitat Evaluation because of the individual significance of wildlife values, subsistence uses and oil and gas potential within the TLSA ecosystem, and the possible conflicts between these values.

The Teshekpuk Lake Special Area has long been considered to be one of the most productive, diverse and sensitive wetland ecosystems in arctic Alaska. The area is of international significance to migratory waterfowl, especially molting black brant, white-fronted and Canada geese. In conjunction with its importance for waterbird populations, the area is also of significant importance for caribou. A population of between 11,000 and 12,000 animals reside year-round within the general area. The region is also used as a subsistence hunting and fishing area by the residents within the region, mainly from the villages of Barrow and Nuiqsut.

Hypothetical scenarios for the production and transport of oil from the TLSA and other areas within the NPR-A were analyzed in The Caribou/Waterbird Impact Analysis Workshop (Gilliam and Lent 1982) for the final Environmental Impact Statement on oil and gas leasing in NPR-A. Those scenarios took into account the hypothetical impact of oil and gas development activities associated with specific wildlife populations. Stipulations were developed through analysis of those scenarios, as well as other studies (Appendix II). However, until a development project within a specific area is proposed, stipulations can only be general in nature. Site specific stipulations would be identified after future development areas are considered in relation to wildlife use in the area. The site specific stipulations would be developed according to the National Environmental Policy Act by preparation of an Environmental Impact Statement, which is required for all NPR-A oil and gas development. For a summary of the conclusions and recommendations of both the caribou and waterbird workshop results see Appendix III.

II. LAND STATUS

The TLSA contains approximately 1,735,000 acres (approximately 10%) of the Alaskan Arctic Coastal Plain. Approximately 32% (560,000 acres) of the TLSA is water--primarily shallow lakes. Approximately 10,000 acres of the area is privately owned by Native allotment holders and corporations, with the remaining 1,725,000 acres under the management of BLM (Appendix IV and Appendix VI, Map 1).

A. Federal Lands

1. Special Management Zone

This zone (Figure 3) was established by the Record of Decision on oil and gas leasing and development in NPR-A. It contains approximately 751,000 acres (excluding the deleted area), of which about 43% (324,000 acres) is water.

BEST COPY AVAILABLE

2. Deleted Area

The deleted area (Figure 3) was established by the Record of Decision on oil and gas leasing and development in NPR-A. It contains approximately 217,000 acres, of which about 34% (73,000 acres) is water.

3. Areas Leased for Oil and Gas

There are five oil and gas lease tracts within the TLSA for a total of 109,000 acres that were leased in the third NPR-A sale in July 1983 (Appendix VI, Map 1).

4. Right-of-Way/Temporary Use Permits

There are 2,846.9 acres of land presently managed under right-of-way permits along with 16.5 acres of land managed under temporary use permits (Appendix IV and Appendix VI, Map 1).

B. Private Lands

1. Native Allotments

There are 27 Native allotments within the TLSA, totalling 3,618.5 acres (Appendix IV and Appendix VI, Map 1).

2. Surface and Subsurface Estate

The Arctic Slope Regional Corporation (ASRC) owns 5,538 acres of both surface and subsurface estate at Cape Halkett. Kwigpik Corporation, Inc. (Nuiqsut village) owns 1,060 acres of surface estate only on Atigaru Point (Appendix IV and Appendix VI, Map 1).

III. EXISTING ECOSYSTEM

The TLSA is bounded on the north and east by the Beaufort Sea, and on the south and west by Fish Creek and the Ikpikpuk River, respectively. The major geographic features within the TLSA include Teshekpuk Lake, Ikpikpuk River, Kogru River and numerous shallow and deep lakes ranging in size from less than one acre (potholes) to several thousand acres. Elevations range from sea level to approximately 250 feet above sea level along the southern boundary.

Teshekpuk Lake is the third largest lake in Alaska with approximately 315 square miles of surface area. The land cover of the Arctic Coastal Plain is generally characterized as a mosaic of moist-to-wet tundra with numerous thaw lakes of varying sizes. The area has a shallow active horizon and is generally saturated throughout the summer months. A pattern of high- and low-center polygons occurs over most of the area. The vegetation consists mainly of mosses (Sphagnum spp.), cottongrass (Eriophorum angustifolium), sedges (*Carex* spp.), rush (*Luzula arctica*), juncus (*Juncus biglumis*) and willow (*Salix* spp.). The important plants of the saltwater marsh environment, in addition to those already listed, include diatoms, brown and red algae, alkali grass and other grasses. For a complete list of plants of the TLSA see Alaska Regional Profiles-Arctic Region (Selkregg 1975).

The major wildlife species known to occur within the TLSA include black brant (*Branta bernicla nigricans*), Canada geese (*Branta canadensis*), snow geese (*Anser caerulescens*), white-fronted geese (*Anser albifrons*), caribou (*Rangifer tarandus*), polar bear (*Ursus maritimus*), arctic fox (*Alopex lagopus*) and wolf (*Canis lupus*). There is a large variety of waterfowl, shorebirds, fish and other birds and mammals which occur within the diverse habitats present within the area. For a complete list of animals that inhabit the TLSA see Alaska Regional Profiles-Arctic Region (Selkregg 1975).

The priority wildlife values for the Teshekpuk Lake Special Area Study included in this evaluation are (1) important or crucial habitats used by waterbirds for molting, nesting and staging and (2) important or crucial calving and insect relief habitats for caribou.

The TLSA provides important wetland habitats for many species of waterbirds. The importance of this area, especially to molting geese, is due in part to the extensive wet meadows associated with numerous large lakes. These wet meadows provide nutrient-rich sedges and grasses that are used extensively by geese after their long, spring migration and during their flightless molting period (Derksen et al. 1979a).

Caribou have used the TLSA for decades, but not until the mid-1970s was the Teshekpuk Lake Caribou Herd (TH) considered to be a separate and distinct herd from the Western Arctic (WAH) and Central Arctic Caribou Herds (CAH) (Davis and Valkenburg 1979). The Teshekpuk Lake Caribou Herd at certain seasons of the year overlaps the range of the adjacent Western Arctic and Central Arctic Herds. However, these seasonal movements are generally minor and the animals move back into their traditional calving grounds, north and east of Teshekpuk Lake, each spring (Reynolds 1982).

Access into the Teshekpuk Lake Special Area is generally limited. During the summer, access is primarily by aircraft on floats with boat traffic on the Ikpikpuk, Kogru and other larger rivers and lakes. In winter, Alaskan Natives (predominately from Barrow and Nuiqsut) use snowmachines to hunt and trap within the area. The area is also accessible to ski-equipped, fixed-wing aircraft during the winter months.

Refer to Alaska Regional Profiles-Arctic Region for a more complete, detailed analysis of the land form, cover types, geology and climatic factors of the area (Selkregg 1975).

IV. BIOLOGICAL VALUES

A. Waterbirds

1. Existing Distribution and Habitat Use

a. Habitats

The coastal plain is characterized by numerous lakes, ponds and extensive wetland habitats, and is one of the largest and most stable collections of wetlands in North America (Wellein and Lumsden 1964). The 1.75 million acres of TLSA comprise approximately 10% of the Alaskan Arctic Coastal Plain. Some areas, such as those north and east of Teshekpuk Lake, have nearly 30% of the surface area covered by water (Sellman et al. 1975). The majority of the TLSA is covered by various wetland habitat classes, although upland tundra and riverine habitats do occur. These wetland habitats have been classified into eight types by Bergman et al. (1977) (Table 1).

b. Avian Species Occurrence

The TLSA is one of the most significant wildlife habitats in arctic Alaska. Compared with the rest of NPR-A, the area has approximately six times the average density of geese, five times the average for tundra swans, three times the average for shorebirds, and twice the average for ducks and loons (U.S. Geological Survey 1979).

One of the most important attributes of the TLSA for avian wildlife is its use by molting geese. The large lakes north and east of Teshekpuk Lake (Figure 4) (Appendix VI, Map 2) from Drew Point to the Kogru River have attracted up to almost 60,000 black brant, Canada, white-fronted and snow geese (Table 2) from Alaska, Canada and Siberia during the molting period (King and Hodges 1979). This area is the most significant known molting resort for non-breeding geese on the arctic coast of Siberia and North America (Derksen et al. 1979b) and is therefore of international significance. No other area of the Arctic Coastal Plain offers the extensive, nutrient-enriched, meadow-like habitats necessary to support such large numbers of geese in association with deep, open lakes that provide security from predators during this flightless period when the geese are highly vulnerable (Derksen et al. 1982). It is of interest to note that lakes of similar size south of Barrow support few molting geese (Derksen et al. 1979b).

Coastal wetlands in the TLSA are also important for post-molting, staging and migrating geese. Canada geese gather for southward migration in these coastal areas. Pacific brant feed almost exclusively on salt marsh vegetation during staging and migration. Large numbers of brant that nest in the Canadian and Alaskan arctic east of the TLSA migrate along the Beaufort Sea coastline during spring and fall migration (Lehnhausen and Quinlan 1981) and utilize coastal wetlands within the TLSA.

TABLE 1*

Wetland Habitat Classes

Flooded Tundra (Class I): temporary wetlands formed by shallow water from spring thaw that overflows stream basins or is trapped in vegetated depressions;

Shallow-Carex (Class II): shallow ponds with gently sloping shore zones surrounded by and containing *Carex aquatilis* with a central open water zone;

Shallow-Arctophila (Class III): ponds containing *Arctophila fulva* in the central zone and shoreward stands of *A. fulva* or *Carex aquatilis*;

Deep-Arctophila (Class IV): ponds with no emergent vegetation in the central zone and *A. fulva* near shore;

Deep-Open (Class V): large deep lakes with abrupt shores and little, if any, emergent vegetation;

Basin-Complex (Class VI): large, partially drained basins which may contain nearly continuous water in spring but as water levels recede, a mosaic of several other classes occurs;

Beaded Stream (Class VII): small streams consisting of channels that connect small pools formed at ice-wedge intersections;

Coastal Wetlands (Class VIII): aquatic habitats bordering the Beaufort Sea within a zone directly influenced by sea water.

---

* Bergman et al. (1977).

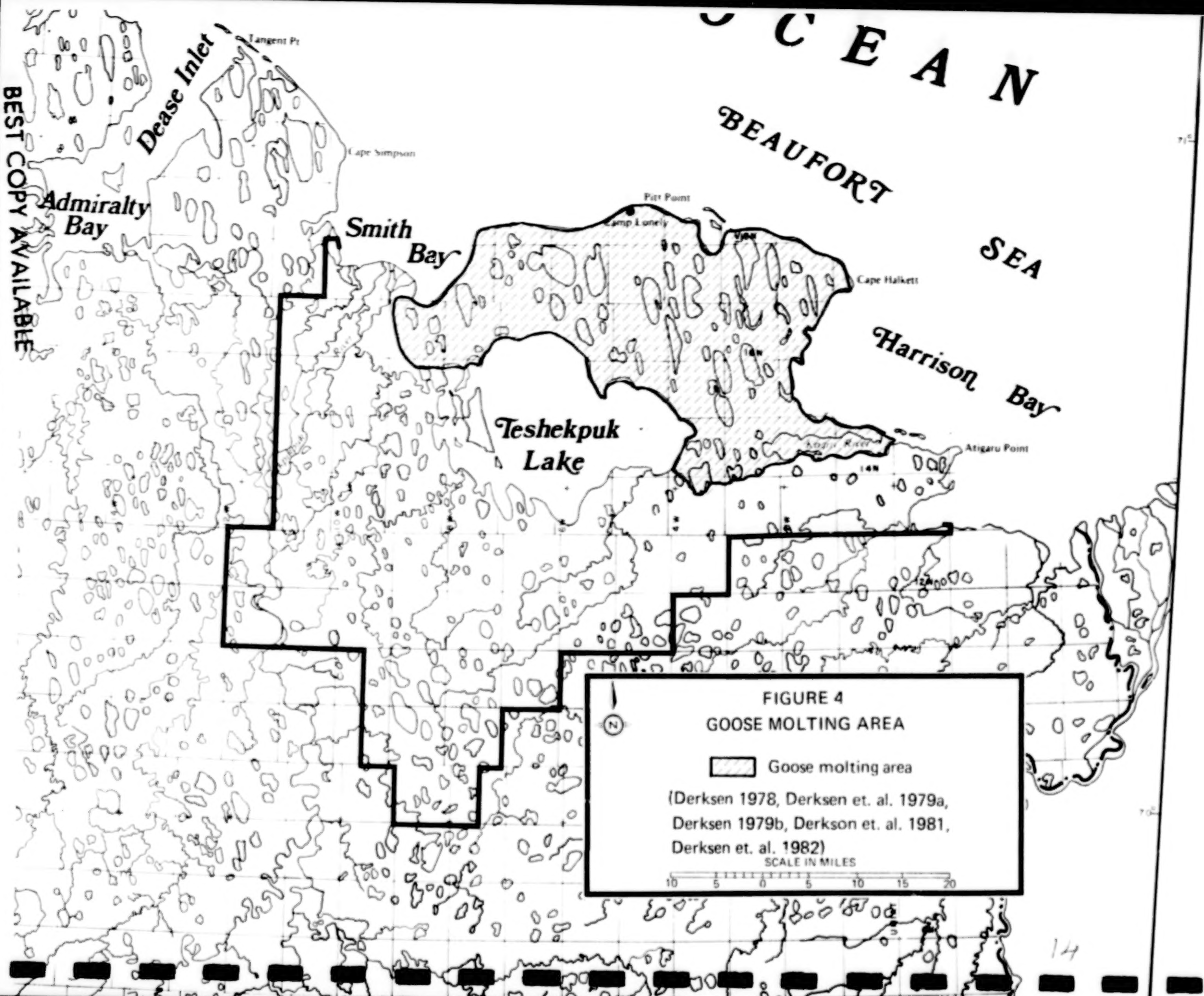


FIGURE 4
GOOSE MOLTING AREA

▨ Goose molting area

(Derksen 1978, Derksen et. al. 1979a, Derksen 1979b, Derkson et. al. 1981, Derksen et. al. 1982)

TABLE 2

Geese Observed during Molting Season on Lakes North and East of Teshekpuk Lake, NPR-A, Alaska

	Black Brant	Canada Geese	White-fronted Geese	Snow Geese	Total
1957[1]	10,000+			1,300+	11,300+
1966[2]	18,365	10,278	3,000	343	31,986
1970[3]					30-50,000
1975[3]	2,240	17,305	1,570	115	21,230
1976[4]	13,998	12,026	4,791	715	31,530
1977[4]	21,988	11,946	2,430	259	36,623
1978[4]	32,732	14,388	1,943	87	49,150
1982[5]	12,161	9,400	1,060	84	22,705
1983[5]	24,446	20,033	2,927	115	47,521
1984[6]	27,145	26,786	4,323	252	58,506

[1] Hansen (1957). Canadas and white-fronts not counted.

[2] King (1970).

[3] Unpublished FWS banding reports (King and Hodges 1979).

[4] Derksen (1978).

[5] King (1984). 1982 survey was after peak of molting period and was incomplete.

[6] D. V. Derksen, FWS, personal communication.

In addition to non-breeding geese molting within the TLSA, black brant and white-fronted geese are regular nesters in the area (Derksen et al. 1979a). Snow goose broods were observed in 1982 and 1983 within the TLSA, as well as in the vicinity of Smith Bay, which is adjacent to the TLSA on the west. This may indicate increasing use of the area by nesters of this species (King 1984).

Tundra swans (*Olor columbianus*) also nest within the TLSA. The highest densities of tundra swans within NPR-A occur southwest of Teshekpuk Lake and from Teshekpuk Lake to the Colville River (Derksen et al. 1981).

Several species of ducks including pintails (*Anas acuta*), oldsquaw (*Clangula hyemalis*) and spectacled eiders (*Somateria fischeri*) are known to breed within the TLSA (Derksen et al. 1981). Greater scaup (*Aythya marila*), king eiders (*Somateria spectabilis*), mallards (*Anas platyrhynchos*) and American wigeon (*Anas americana*) were also observed by Derksen et al. (1979a) at study sites within the TLSA, but were uncommon. An important factor of duck utilization of the TLSA is the periodic displacement of large numbers of pintails from southern prairie pothole breeding areas during drought periods to the Arctic Coastal Plain (Derksen and Eldridge 1980). Derksen et al. (1979a) reported densities of over 118 pintails per square mile at Teshekpuk Lake in 1977 during such a drought displacement.

Three species of loons have been observed within the TLSA (Derksen et al. 1981). Arctic loons (*Gavia arctica*) are the most abundant (Derksen et al. 1979a) and are considered common nesters on the arctic slope (Pitelka 1974). Red-throated loons (*Gavia stellata*) are less common on the arctic slope but were more abundant at study sites within the TLSA than other NPR-A study sites investigated by Derksen et al. (1979a). Yellow-billed loons (*Gavia adamsii*) were the least abundant and are not known to nest within the TLSA (Derksen et al. 1979a).

A variety of shorebirds are known to use the TLSA, including red phalaropes (*Phalaropus fulicarius*), northern phalaropes (*Phalaropus lobatus*), pectoral sandpipers (*Calidris melanotos*) and long-billed dowitchers (*Limnodromus scolopaceus*) (Derksen et al. 1979a). The highest densities of shorebirds on the coastal plain are found within 20 miles of the Beaufort Sea coastline. Coastal lagoons and wetlands are used intensively by shorebirds staging for their southward migration during August and September (NPR-A Task Force 1979).

Three species of jaeger, two species of gull, and the arctic tern (*Sterna paradisaea*) inhabit the TLSA (Derksen et al. 1979a). Both parasitic *Stercorarius parisiticus*) and long-tailed jaegers (*S. longicaudus*) nest in the area, whereas large numbers of pomarine jaegers (*S. pomarinus*) were observed migrating through the area by Derksen et al. (1979a). Glaucous gulls (*Larus hyperboreus*) and Sabine's gulls (*Xema sabini*) nest in the area and concentrate in coastal areas in August (Derksen et al. 1979a). Arctic terns exist at low densities within the TLSA as compared to more inland sites in NPR-A.

Species other than waterbirds that inhabit the TLSA include a variety of passerines. Of these, lapland longspurs (*Calcarius lapponicus*) are the most abundant. Peregrine falcons (*Falco peregrinus tundrius*) have been observed in the area occasionally (Derksen et al. 1979a) and are probably migrants since there are no known nesting areas within or closely adjacent to the TLSA (R.E. Ambrose, FWS, personal communication). Snowy owls (*Nyctea scandiaca*) and short-earred owls (*Asio flammeus*) have been observed in the area. Rock ptarmigan (*Lagopus mutus*) are also known to inhabit the area at low densities.

From this discussion, it is obvious that during the summer and early fall the TLSA supports a diverse and abundant avian community of migratory species dominated by water-related birds. Habitats within the area provide resources for these birds during nesting and young-rearing, molting, and late summer-early fall staging for southward migration. The TLSA is utilized by an internationally significant assemblage of avian species, and is one of the most important areas along the Arctic Coastal Plain.

Migratory waterfowl are covered by international treaties with countries that they inhabit during some part of their migratory cycle, including Canada, Mexico, Japan and the Union of Soviet Socialists Republics (USSR). These treaties direct each nation to undertake measures necessary to protect and enhance migratory species and their habitats, so that citizens of all countries can utilize and enjoy them. Any activities that affect the population size or distribution of migratory waterfowl have international implications because of these treaty obligations.

2. Priority Species

As per memorandums of understanding with the U.S. Fish and Wildlife Service and the State of Alaska, and the District Manager's concept, waterbirds (particularly black brant) were identified as a biological resource worthy of special consideration and protection. Therefore, the four species of Pacific black brant, Canada, white-fronted and lesser snow geese, have been given priority in this Habitat Evaluation.

a. Pacific Black Brant

(1) Rangewide Considerations

(a) Population Status

During the mid-1970s, waterfowl managers recognized that Pacific black brant were declining and countries along the Pacific Flyway began establishing special hunting regulations to promote recovery of this internationally important resource. Washington and Oregon have closed the hunting season for brant, while California and Mexico are continuing to allow harvest of brant at strictly limited levels. The Association of Village Council Presidents for the Yukon-Kuskokwim Delta has recently agreed to reduce subsistence harvesting of black brant in this important nesting area.

The Pacific Waterfowl Flyway Council (1981) set a minimum population level of 120,000 brant as the level at which all sport harvest of brant in the Pacific Flyway will be prohibited and a reduced subsistence take will be encouraged. The 1984 three-year mean average population estimate was 121,262; perilously close to the 120,000 brant limit. The Pacific Waterfowl Flyway Council (1981) has established a population goal of 185,000 brant as necessary to meet the sport hunting and subsistence needs while ensuring the continued survival of the Pacific black brant population.

In March of 1985 the Yukon-Kuskokwim Delta Goose Management Plan was signed by the FWS, California Department of Fish and Game, Alaska Department of Fish and Game, the association of village council presidents and the association's waterfowl conservation committee. This plan helps protect the declining brant population by prohibiting subsistence hunting during nesting, brood rearing and molting, and prohibits egg collecting. Proposed population objectives for the brant are 185,000 birds with a harvest resumption level of 140,000 birds.

Brant numbers have been determined annually by mid-winter aerial surveys. Bird counts for population-trend determination have been conducted by the FWS, in cooperation with Mexican and state governments, since 1954 (Pacific Waterfowl Flyway Council 1981). Population estimates have ranged from 110,204 to 171,325 during this period, based on a three-year mean average.

(b) Distribution

The Pacific black brant population is indigenous to the western coast of North America, although small numbers breed in Siberia and some winter in Japan (Bellrose 1976). In North America, brant range from the central Canadian arctic around the Alaskan coastline of the Beaufort, Chukchi and Bering Seas south to Baja California and mainland Mexico.

The major production area for black brant is the Yukon-Kuskokwim Delta where up to 50% of all black brant are produced (Pacific Waterfowl Flyway Council 1981). Other breeding areas include the North Slope of Alaska, the Canadian arctic, and the Siberian coastline and Wrangel Island of the USSR.

Fall migrants from the entire breeding range of the population congregate at Izembek Lagoon on the Alaska Peninsula to stage for migration across the Pacific Ocean to wintering areas in Mexico, California, Oregon, Washington and British Columbia.

(c) Life History

Most black brant breed at three years of age (Bellrose 1976). Breeders arrive at nesting areas in mid-May. Brant tend to nest in colonies in close proximity to the sea coast or tidal estuaries. Because of this nesting behavior, storm tides can drastically affect production by disrupting nesting activity and destroying nesting habitats.

Subadults and adult nonbreeders congregate in areas such as the vicinity of Teshekpuk Lake to molt, whereas breeders molt in the vicinity of the nesting colony (Derksen et al. 1982). There are several benefits for separation of breeders and nonbreeders. First, it eliminates foraging competition between the two groups. Second, it allows individuals or small groups of breeders to use habitats that may not support large numbers of black brant, or where it allows hiding from predators as a reasonable strategy, because large numbers of nonbreeding brant will attract predators. Finally, it allows nonbreeding brant to select areas where they can use large lakes to escape from predators and it allows large numbers of brant to congregate and forage more efficiently while benefiting from predator detection by other group members.

(d) Socioeconomic Significance and Concerns

There is concern for the future of the black brant. The decline in the overall population discussed above is of major concern. Black brant are popular with sport hunters, and recreational harvest has been drastically curtailed or eliminated in the U.S. because of seriously low population levels. Sport hunting in Mexico is presently of modest proportions but has the potential of becoming a serious management issue (Pacific Waterfowl Flyway Council 1981). Guiding sport hunters is an important source of income for Mexican Natives and elimination of brant hunting opportunities will have deleterious socioeconomic effects. Subsistence harvest in northern production areas is thought to contribute significantly to the overall harvest of brant, but the magnitude of the kill has been difficult to assess. As discussed earlier, the new goose management plan for the Yukon-Kuskokwim delta area will help significantly in lowering the annual harvest of this declining population. Any decline in the brant population from actions within the TLSA would have socioeconomic implications on the subsistence activities of the Yukon-Kuskokwim delta.

In addition to consumptive values, black brant provide many nonconsumptive values including research, environmental appreciation and awareness, and educational opportunities. Geese are important species for wildlife viewing since they tend to congregate in large numbers on traditional nesting, migration and wintering areas.

The brant have begun to use more southerly wintering areas in Mexico, thus reducing populations on wintering areas in the U.S. In 1958, 55,000 brant wintered in the U.S., but by 1972 that number had decreased to 5,000 (Pacific Waterfowl Flyway Council 1981). The abandonment of wintering areas in the U.S. and consequent change in distribution has probably been caused by human disturbance and alterations of wetland habitats (Schroeder 1984).

Brant nesting, staging and winter habitats are not secure from disturbance, degradation or loss. Federal outer continental shelf lease sales near breeding areas may be opened for petroleum exploration and potential future development. Exploration for oil and gas is already underway in the outer continental shelf north of Izembek Lagoon, which is the single most important spring and fall staging habitat for brant. Wintering estuarine habitats in the states of Washington, Oregon and California have been altered by development, and disturbance from commercial and recreational activities has contributed to reduced habitat quality. Similarly, there are threats to the habitat integrity of the TLSA. The Arctic Slope Regional Corporation owns and manages about 5,500 acres of prime coastal goose molting and staging habitat northeast of Teshekpuk Lake. The ASRC has completed one exploration well on this acreage, and the area may be used for support of future petroleum development. Another regional corporation, Cook Inlet, has a lease to operate portions of Camp Lonely, which is located on the northern coastal edge of the goose molting area and important coastal wetlands. Because private lands and existing oil and gas lease tracts do occur within the TLSA, the potential of oil and gas and other activities affecting the integrity of habitats within this area does exist.

(2) Teshekpuk Lake

(a) Distribution and Abundance

Black brant begin arriving in the TLSA in late May and early June. Breeding populations, including a colony of approximately 100 pairs on Island Lake, are established by mid-June (Derksen et al. 1982). Large flocks of brant begin congregating the last two weeks of June and the first week of July Derksen et al. (1979a) on the large lakes north and east of Teshekpuk Lake.

Nonbreeding brant are in full wing-molt, and therefore flightless, by the second week of July. Distribution of molting brant, represented in Figure 5, is based on mid-July aerial surveys during six years (1976, 1977, 1978, 1982, 1983 and 1984). Flocks as large as 5,200 brant have been observed on a single lake.

Regrowth of flight feathers takes 21 to 26 days (Derksen et al. 1982) and brant regain flight capability around August 5. At this time, brant shift to bays, lagoons, river deltas and coastal wetlands of the TLSA adjacent to the Beaufort Sea (Derksen et al. 1979a) to stage for migration around the coast of Alaska to Izembek Lagoon on the Alaska Peninsula. Derksen et al. (1979b) reported that by August 2, 1978, 69% of the 23,676 brant observed during an aerial survey were on coastal wetlands, bays, lagoons and river deltas. In addition to birds that spend the summer in the TLSA, these coastal wetlands are used by black brant and other birds migrating from the Alaskan and Canadian arctic east of Teshekpuk Lake. Most brant have left the TLSA by mid-September.

An average of 18% of the world's Pacific black brant population congregates in the Teshekpuk Lake area to molt (Table 3). King and Hodges (1979) stated that possibly all non-nesting black brant from arctic areas of Alaska, Canada and Siberia, including subadults and adults that either did not nest or were failed breeders, sought the Teshekpuk Lake area to molt. Any impacts to this molting aggregation may have adverse effects on the breeding populations of Pacific black brant, since subadult geese are the core of future Asian and North American breeding populations.

Black brant banded at Teshekpuk Lake have been recovered from breeding areas in Canada and Siberia as well as from migration and wintering areas in Puget Sound, Washington; north-coastal California; and Baja California, Mexico (King and Hodges 1979).

(b) Habitat Use

Bergman et al. (1977) showed that black brant used Coastal Wetlands (Class VIII) during migration, then shifted to Deep-Arctophila (Class IV) wetlands for nesting. Derksen et al. (1981) mentioned that most broods are found on Deep Open (Class V) lakes. Bergman et al. (1977) and Mickelson (1975) reported

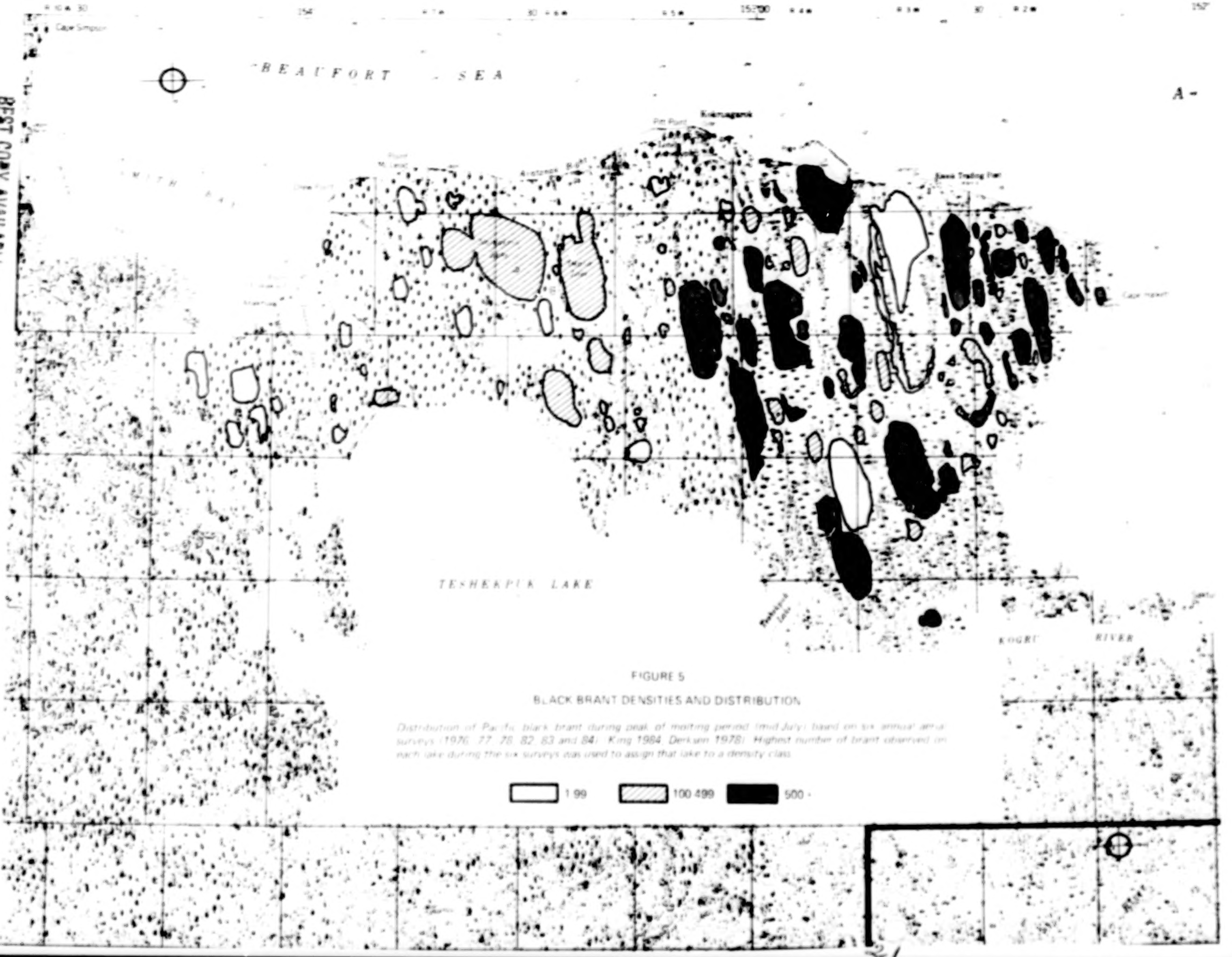


FIGURE 5

BLACK BRANT DENSITIES AND DISTRIBUTION

Distribution of Pacific black brant during peak of molting period (mid July) based on six annual aerial surveys (1976, 77, 78, 82, 83 and 84) (King 1984, Derksen 1978). Highest number of brant observed on each lake during the six surveys was used to assign that lake to a density class.

TABLE 3

Percentage of Pacific Black Brant Population Molting on Lakes North and East of Teshekpuk Lake, Based on Mid-July Aerial Surveys

Year	Total Pacific[1] Black Brant	Black Brant Molting at Teshekpuk Lake	Percent of Population
1966[2]	171,325	18,365	11
1976	125,395	13,998	11
1977	130,834	21,998	17
1978	143,966	32,732	23
1982[3]	153,869	12,161	8
1983	141,518	24,446	17
1984	121,262	27,145	22
		Mean[4]	18

---

[1] three-year mean average of FWS aerial survey data.

[2] 1966 survey area may have differed from other years. Survey techniques were standardized for survey from 1976 to present.

[3] 1982 survey conducted on July 28 after peak of molt, and only about 50% of the lakes in the goose molting area were surveyed.

[4] Mean excludes 1966 and 1982 survey data because of reasons stated above.

movements of brant broods to coastal lagoons, tidal sloughs and river deltas. Beaded Streams (Class VII) may be important corridors for flightless adults with young moving to rearing habitats along the coast.

Molting brant are almost always associated with the shorelines of Deep-Open (Class V) lakes, and predominately on those with gently sloping shorelines (Derksen et al. 1979b). These lakes provide security from predators, uninterrupted visibility to detect predators, and abundant food on wetlands adjacent to the lakes. As mentioned earlier, black brant in the area shift to Coastal Wetlands (Class VIII) following the molt to build up fat reserves prior to their southward migration. These coastal wetlands are also used by brant migrating through the TLSA from the east.

(3) Sensitivity to Impacts

Black brant are noted for being highly susceptible to human disturbance (Einarsen 1965). Increased human activity on U.S. wintering areas may be a major cause for the shift of black brant to wintering areas in Mexico and the avoidance of wintering areas in California (Schroeder 1984). Black brant wintering in Baja California are known to avoid areas of human activity (Kramer et al. 1979). A discussion of potential impacts of oil and gas-related activities on waterbirds is presented in a later section entitled "Discussion - Sensitivity to Impacts".

b. Canada Geese

(1) Rangewide Considerations

(a) Population Status

Canada geese using the Teshekpuk Lake vicinity appear to be representatives of two subspecies: *Branta canadensis parvipes* and *B. c. taverneri* (King and Hodges 1979). Based on winter surveys, the FWS (1983) estimated a worldwide population of approximately 150,000 geese in these two subspecies. The FWS objectives for wintering populations of these two subspecies are similar to the present size.

(b) Distribution

Johnson et al. (1979) suggested that these two subspecies are divided geographically, based on breeding ranges with *B. c. taverneri* using tundra habitats and *B. c. parvipes* using forested habitats of interior Alaska. These subspecies winter in Washington, Oregon and California, and fall and spring migrations appear to occur through interior Alaska, British Columbia and western Alberta.

(c) Life History

Some yearling and two-year-old Canada geese attempt to breed but most do not breed until their third year. Apparently, few Canada geese breed on NPR-A. Breeding pairs occur along the Colville River, but King (1970) and Derksen et al. (1981) reported observing only molters on the coastal plain.

Nonbreeders, both juveniles and failed breeders, are the first to molt and may move only a few miles from nesting areas, or may migrate hundreds of miles to the north (Bellrose 1976).

(d) Socioeconomic Significance and Concerns

These two subspecies of Canada geese are an important sport hunting resource in Canada, Alaska, Washington, Oregon and California. *B. c. parvipes* and *taverneri* account for an estimated 60% of the annual goose harvest in western Washington and Oregon (FWS 1983). Populations of these two subspecies are considered to be stable or expanding while there have been reductions in other Canada geese wintering in Washington, Oregon and California. Therefore, these subspecies are of special and increasing importance in maintaining sport hunting opportunities. In addition Canada geese, like other waterfowl species, provide many nonconsumptive values as discussed earlier under black brant.

(2) Teshekpuk Lake

(a) Distribution and Abundance

Canada geese do not nest within the TLSA (King 1970, Derksen et al. 1981), but large numbers of nonbreeders congregate in the area to molt beginning as early as June 10 (Table 2). In 1984, 26,800 Canada geese were observed at Teshekpuk Lake during the molt, which accounts for 20% of the total population of these two subspecies. King (1970) suggested that large numbers of nonbreeding *B. c. parvipes* from interior Alaska breeding areas migrate long distances to join the tundra-nesting *B. c. taverneri* nonbreeders.

Canada geese molt earlier than black brant and white-fronted geese at Teshekpuk Lake and most have flown to coastal areas by August 2 (Derksen et al. 1979b). Some Canada geese have regained flight capability as early as July 18 according to Derksen et al. (1979b). Distribution of Canada geese molting within the TLSA is summarized in Figure 6 based on mid-July aerial surveys from 1976, 1977, 1978, 1982, 1983 and 1984.

Following the molt, Canada geese shift to coastal wetlands like the black brant. Derksen et al. (1979a) reported that on August 2, 1978, 74% of the 16,392 Canada geese observed were using coastal wetlands. Canada geese stage for migration throughout August and most have left the TLSA by mid-September. Canada geese banded near Teshekpuk Lake have been recovered during migration in interior Alaska, British Columbia and western Alberta and from wintering areas in Washington, Oregon and California (King and Hodges 1979).

(b) Habitat Use

Early arriving Canada geese graze in upland areas. In late June, they join molting flocks in the large lake basins where Deep-Open (Class V) lakes are preferred (Derksen et al. 1979a). Following the molt, Canada geese move to Coastal Wetlands (Class VIII) to stage for migration.

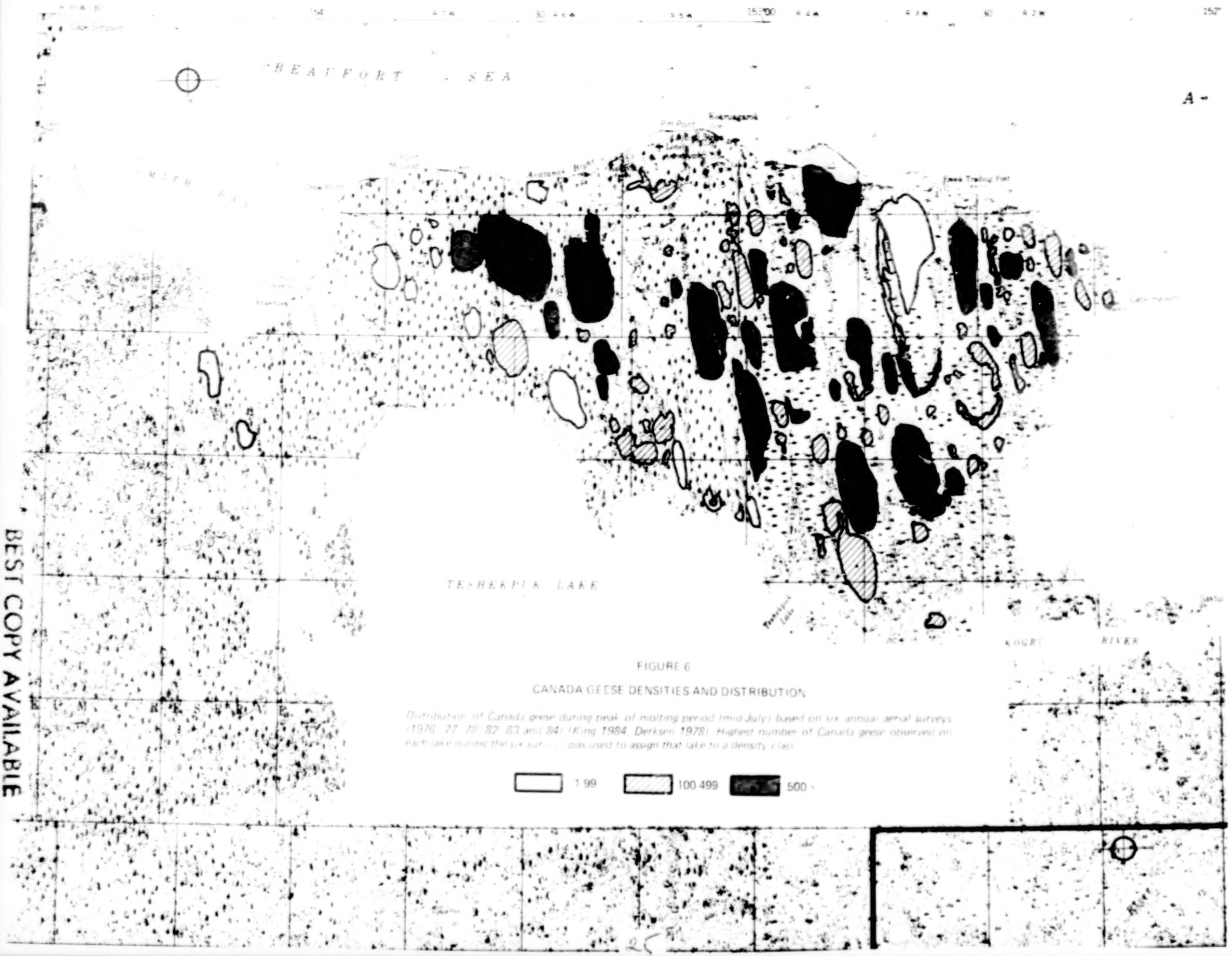


FIGURE 6

CANADA GEESE DENSITIES AND DISTRIBUTION

Distribution of Canada geese during peak of molting period (mid-July) based on six annual aerial surveys (1976, 77, 78, 82, 83 and 84) (King 1984, Derksen 1978). Highest number of Canada geese observed on each lake during the six surveys was used to assign that lake to a density class.

(3) Sensitivity to Impacts

Information on Canada geese in the Canadian arctic indicates that these geese may be highly susceptible to disturbance during the molting period and that even low levels of human activity can result in the abandonment of important habitats (Sterling and Dzubin 1967). A discussion of potential impacts of oil and gas-related activities on waterbirds is presented in a later section entitled "Discussion - Sensitivity to Impacts."

c. White-fronted Geese

(1) Rangewide Considerations

(a) Population Status

White-fronted geese using the Arctic Coastal Plain are members of the mid-continent population. This population is estimated at around 200,000 (Benning 1984) and is apparently stable.

(b) Distribution

The mid-continent population of white-fronted geese is made up of birds from breeding grounds in Alaska (other than the Yukon-Kuskokwim Delta which are part of the Pacific Flyway population) and from the Canadian arctic. There are two breeding subpopulations, with the western breeding population originating from Alaska and western Canada and the eastern subpopulation originating from breeding grounds in the central Canadian arctic (Bellrose 1976).

King, in Bellrose (1976), estimated the post-breeding population on the arctic slope of Alaska to be nearly 54,000 white-fronts, including 5,800 breeders, 12,800 immatures and 35,000 nonbreeders. He also stated that the breeding white-fronted geese are evenly distributed throughout the lake areas of the North Slope and this was substantiated by Derksen et al. (1981). Most of the nonbreeders are thought to be from interior Alaska nesting areas on the Kobuk River, Yukon Flats, upper Koyukuk River and lower Tanana River since the arctic breeding population could not produce this large number of nonbreeders.

Most, if not all, of the western subpopulation stages in southeastern Alberta and southwestern Saskatchewan, forming the greatest concentration of the species in interior North America (Bellrose 1976). Wintering areas for this population are mainly located in the coastal marshes of western Louisiana, Texas and eastern Mexico, and on the interior lakes and reservoirs of Mexico.

(c) Life History

White-fronts first breed at three years of age, although some two-year-olds may breed if conditions are favorable. Family ties seem to persist in white-fronted geese, with yearlings remaining with their parents during the subsequent nesting attempt of the adults (Barry 1966).

(d) Socioeconomic Significance and Concerns

As with brant and Canada geese, white-fronted geese are an important sport hunting resource. White-fronts are the second-most-important goose in the Central Flyway harvest. The harvest of white-fronted geese in the Central Flyway averaged over 46,000 birds during 1971-80. The population from the TLSA is hunted in western Canada, the central U.S. and Mexico.

White-fronted geese also provide the same nonconsumptive values as mentioned for the previous goose species.

(2) Teshekpuk Lake

(a) Distribution and Abundance

Numbers of white-fronted geese in the TLSA north and east of Teshekpuk Lake have varied from 1,000 to 5,000 (Table 2). White-fronts are more concentrated in the western portion of the goose molting area (Figure 7) and occur farther from the coast than black brant or Canada geese (Derksen et al. 1979b). Although molting flocks of white-fronts are found throughout the Arctic Coastal Plain, they are more concentrated on lakes near Teshekpuk Lake than elsewhere (Derksen et al. 1981). Broods have been observed during surveys in the goose molting area (Derksen 1978, King 1984). White-fronted geese nest in wetland habitats throughout the TLSA.

Unlike Canada geese and black brant, most white-fronted geese do not shift to coastal wetlands following wing molt (Derksen et al. 1979a). This may be due to a difference in food preference or their interior migration route through Canada to southcentral U.S. wintering areas (King and Hodges 1979, Bellrose 1976).

White-fronted geese banded at Teshekpuk Lake were 26% second-year birds, which is much lower than the percentage for black brant and snow geese (King and Hodges 1979). This indicates that white-fronts are more dispersed during molting as reported by King (1970).

Band recoveries indicate that white-fronts banded at Teshekpuk Lake migrate east across the Alaskan arctic coast, then south through the Northwest Territories, Alberta, and southwest Saskatchewan to wintering areas on the Gulf Coast of Texas, Louisiana and Mexico as well as interior Mexico (King and Hodges 1979). King and Hodges (1979) indicated that the migration pattern was so tight that it might represent a local nesting population with little overlap of adjacent populations. This could be explained by the close family ties exhibited by white-fronted geese (Bellrose 1976).

(b) Habitat Use

White-fronted geese use Flooded Tundra (Class I) and Shallow-Carex (Class II) wetlands early in the season (Derksen et al. 1979a) and nest on upland sites or polygonal ridges near Shallow-Carex (Class II) or Arctophila (Classes III and IV) wetlands (Derksen et al. 1981). Family groups and pairs graze in

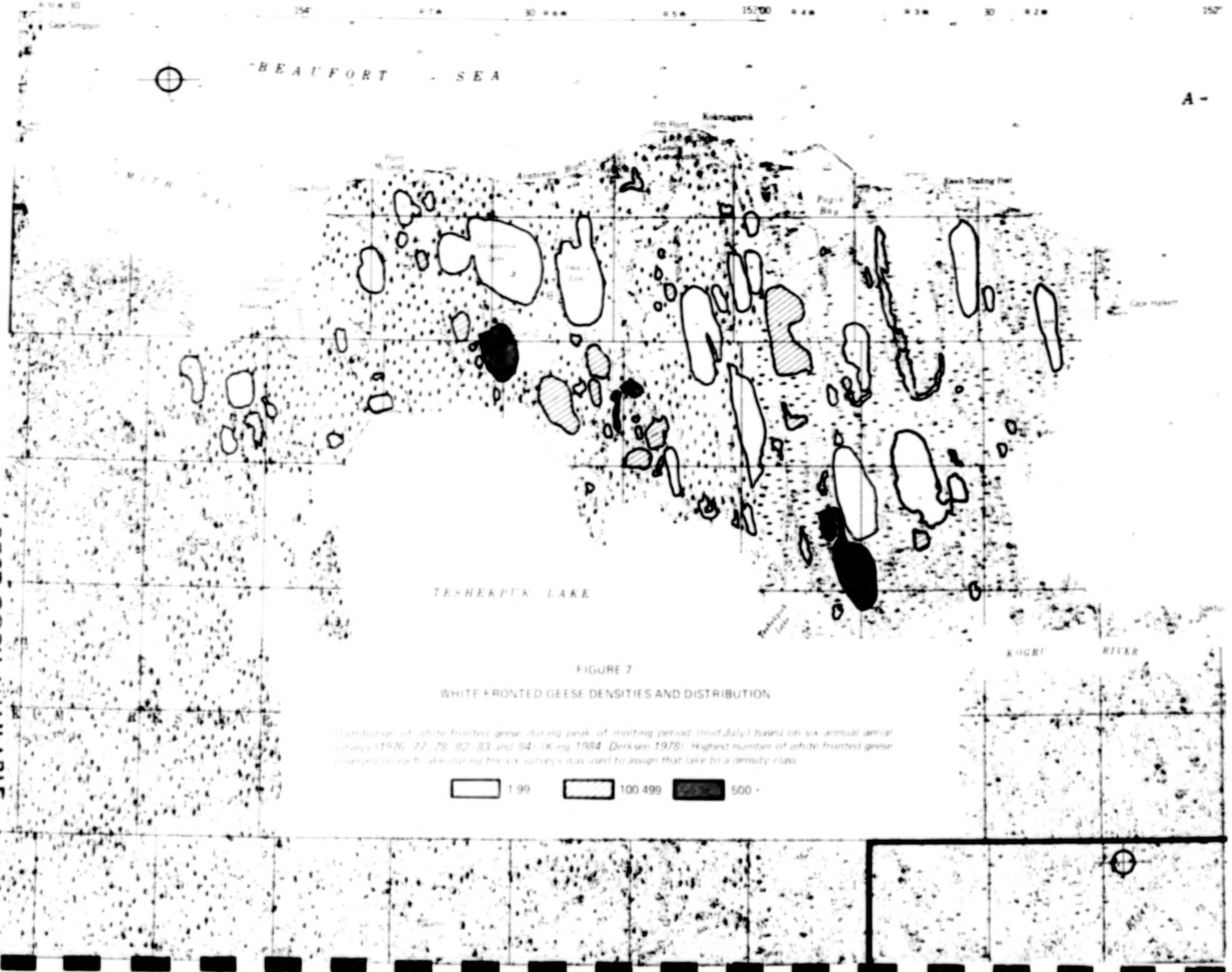


FIGURE 7

WHITE FRONTED GEESE DENSITIES AND DISTRIBUTION

Distribution of white fronted geese during peak of molting period (mid July) based on six annual aerial surveys (1976, 77, 78, 82, 83 and 84) (King 1984, Derksen 1978). Highest number of white fronted geese observed on each lake during the six surveys was used to assign that lake to a density class.

upland sites during June and July as well as in Beaded Streams (Class VII), Deep-Arctophila (Class IV) and Deep-Open (Class V) wetlands (Derksen et al. 1979a). Beaded Streams (Class VII) appear to be important transportation routes for flightless young and adults, as with black brant. Deep-Open (Class V) lakes are selected by molting nonbreeders (Derksen et al. 1981).

(3) Sensitivity to Impacts

Local breeding populations of white-fronted geese, such as those at Teshekpuk Lake, are apparently distinct from adjacent populations (Bellrose 1976, King and Hodges 1979). Effects of disturbances related to oil and gas activities will be localized and intensified since disturbing effects will not be spread over a much larger regional population. A discussion of potential impacts of oil and gas-related activities on waterbirds is presented in a later section entitled "Discussion - Sensitivity to Impacts".

d. Lesser Snow Geese

(1) Rangewide Considerations

(a) Population Status

Snow geese at Teshekpuk Lake are members of a population that breeds in the western arctic of North America, although there has been some interchange between Alaskan arctic slope geese and USSR breeding populations (King and Hodges 1979). The population size for geese of the western arctic is difficult to estimate since the geese intermingle with the Soviet population on wintering areas in the U.S. and Canada. Bellrose (1976) mentions an upward trend in Pacific Flyway snow geese until 1968, when they peaked at around 500,000 birds. The population subsequently dropped to near 440,000, primarily due to a decline in the number of snow geese breeding on Wrangel Island off the Siberian Coast. The breeding population on Wrangel Island dropped from 120,000 in 1970 to 44,000 in 1976, which is well below the nesting area's population objective of 120,000 birds being considered by the Pacific Waterfowl Flyway Council (1980).

Snow goose populations on the Alaskan arctic slope vary from year to year and are probably considerably less than former populations. Hansen (1957) reported 1,300 molting snow geese at Cape Halkett. Gabrielson and Lincoln (1959) indicated that breeding snow geese were much more common in the past. Anderson (1919) stated that the Cape Halkett area was an important molting snow geese hunting area for the Eskimos, but provided no estimate of population numbers. Derksen et al. (1979b) indicated that populations were probably much greater around the turn of the century than when Hansen (1957) did his surveys.

A small colony of snow geese nests on Howe Island in the Sagavanirktok River Delta. Fewer birds had been seen in the area from the mid to late 1970s, possibly due to intensive helicopter traffic in the vicinity (Derksen et al. 1981). In recent years the colony has consisted of approximately 50-100 breeding pairs (Johnson et al. 1985). There is evidence that the nonbreeding segment of this colony molts in the TLSA (D.V. Derksen, FWS, personal communication). King (1970) observed other breeding snow geese widely scattered on lakes within two or three miles of the coast from Barrow to the Colville River.

(b) Distribution

Lesser snow geese of the Pacific Flyway originate on major breeding grounds on Wrangel Island, Siberia and Banks Island in the Canadian high arctic. Other breeding areas include the Anderson River and MacKenzie River Deltas of Canada. Smaller numbers of snow geese breed at Howe Island, Smith Bay and the Teshekpuk Lake vicinity of the Alaskan arctic slope as mentioned above.

The MacKenzie River Delta of Canada and the Canning River Delta of Alaska are major fall staging areas. Snow geese migrate through central Canada to important resting and feeding areas in southeastern Alberta and southwestern Saskatchewan. Wrangel Island breeders are thought to migrate through several corridors across Alaska (Bellrose 1976).

Over 90% of the snow geese in the Pacific Flyway winter in the Central and Imperial Valleys of California. Other important wintering areas include Puget Sound, Washington; southern British Columbia; Oregon; Arizona; and Nevada (Bellrose 1976). Some snow geese also winter in Mexico.

(c) Life History

As with black brant, Canada and white-fronted geese, most snow geese do not breed until three years of age. Yearlings will return to the vicinity of their natal colony (Bellrose 1976).

(d) Socioeconomic Significance and Concerns

As with other goose species, snow geese are an important sport hunting resource. Snow geese are second in importance in the goose harvest of the Pacific Flyway and have averaged between nine and 40% of the geese harvested. Over 47,000 snow geese were harvested in the Pacific Flyway in 1983.

Snow geese also provide the same nonconsumptive values as mentioned for the previous goose species.

(2) Teshekpuk Lake

(a) Distribution and Abundance

Relatively small numbers of snow geese use the TLSA compared to the other three goose species (Table 2). However, breeding snow geese seem to be more prevalent here than elsewhere on the North Slope (King 1970) except for the Howe Island colony. Snow goose broods have been observed within the molting area north and east of Teshekpuk Lake as well as on the southwest side of Smith Bay, adjacent to the TLSA.

Although snow geese are prevalent in the Pacific Flyway, few nest within the United States. The Howe Island breeding colony and scattered nesters across the North Slope, particularly in the TLSA and adjacent Smith Bay vicinity, constitute the present nesting population. Nesting snow geese have been consistently observed within the TLSA and Smith Bay area. King (1984) suggested that re-establishment of historic nesting colonies in the Smith Bay-Teshekpuk Lake vicinity may occur if this area remains undisturbed.

Migrating snow geese were observed in the area in June (Derksen et al. 1981). Molting geese have been observed with flocks of black brant (King 1970), and use several of the lakes north and east of Teshekpuk Lake (Figure 8).

Molting snow geese at Teshekpuk Lake apparently originate from nesting areas on Wrangel Island in the USSR, the MacKenzie and Anderson River Deltas of Canada (King and Hodges 1979), and Howe Island. Snow geese banded at Teshekpuk Lake have been recovered from wintering areas in California and Mexico, as well as from migration routes through Canada.

(b) Habitat Use

Molting snow geese tend to use Deep-Open (Class V) lakes as do other molting geese. The few observations of nesting geese are not sufficient to determine their habitat preferences.

(3) Sensitivity to Impacts

Breeding snow geese are consistently observed within the TLSA and Smith Bay areas, although nesting is limited on the North Slope. The TLSA has the potential for re-establishment of viable nesting colonies of snow geese if left undisturbed. A discussion of potential impacts of oil and gas-related activities on waterbirds is presented in a later section entitled "Discussion - Sensitivity to Impacts."

3. Other Species

a. Ducks

Pintails, oldsquaw and spectacled eiders are known to nest within the TLSA.

(1) Pintail

The pintail is probably the most abundant duck species on the coastal plain with densities equal to or greater than other duck species in coastal areas (Derksen et al. 1981). Nesting by pintails is more regular in NPR-A than elsewhere on the coastal plain (Pitelka 1974).

An important factor of pintail utilization of the North Slope is the periodic influx of thousands of pintails to the area when displaced during drought years in southern breeding areas. During such a drought displacement in 1977, Derksen et al. (1979a) reported densities of pintails as high as 118 per square mile. Sex ratios are heavily skewed to males and most are probably nonbreeders. However, by leaving breeding areas to the south that are drought-stressed, these birds reduce competition with breeders for food and probably improve their own body condition and subsequent survival (Derksen and Eldridge 1980).

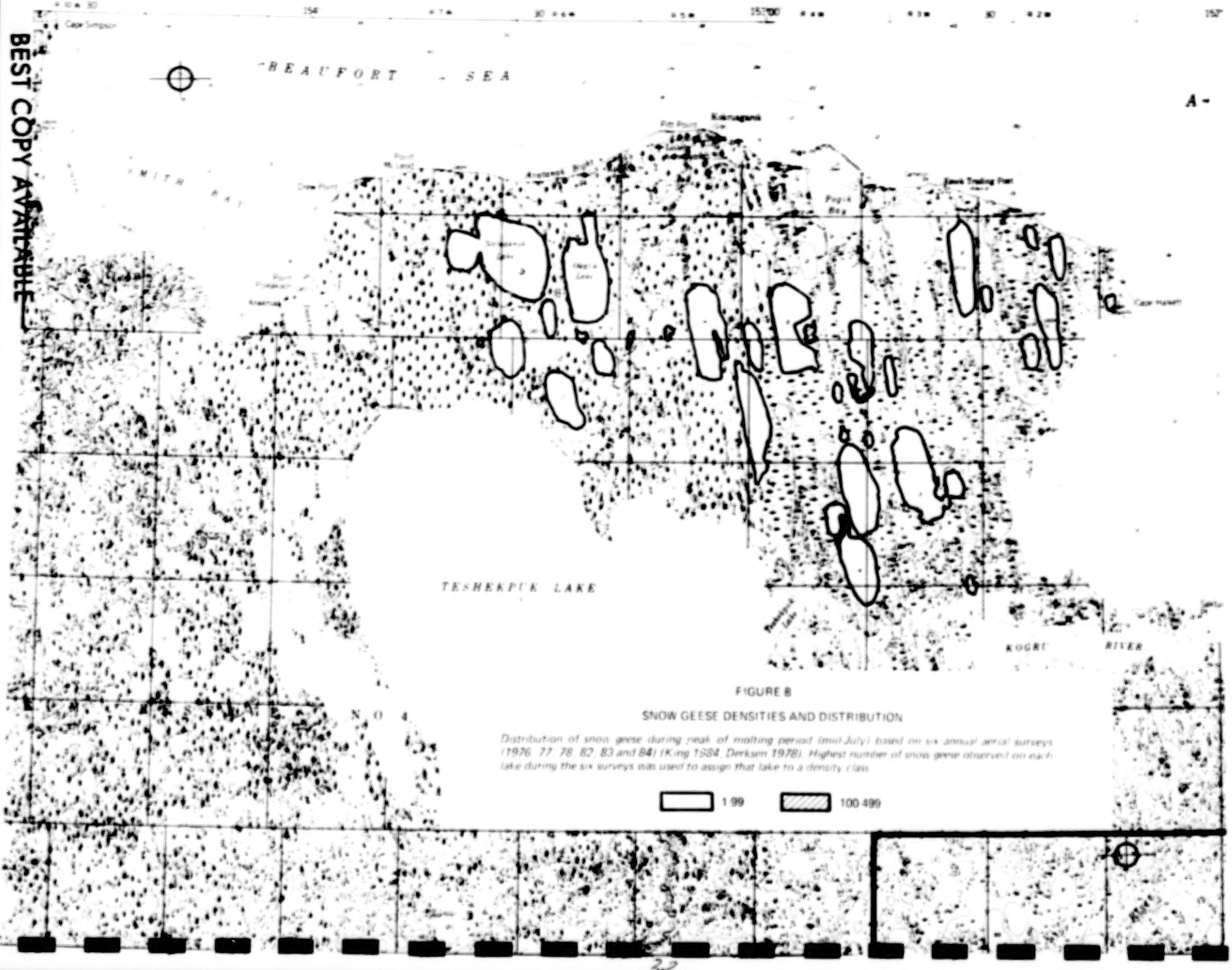


FIGURE 8

SNOW GEESE DENSITIES AND DISTRIBUTION

Distribution of snow geese during peak of molting period (mid-July) based on six annual aerial surveys (1976, 77, 78, 82, 83 and 84) (King 1984, Derksen 1978). Highest number of snow geese observed on each lake during the six surveys was used to assign that lake to a density class.

Pintails not only nest in the TLSA and use it during drought years on southern breeding ranges, but also use it as an important molting area (D.V. Derksen, FWS, personal communication).

Pintails prefer the various Arctophila (Classes III,IV, and VII) wetlands throughout the summer. Pintails use the only water areas available, Flooded Tundra (Class I), when they arrive in late May and June, but soon move to Shallow-Arctophila (Class III) ponds. These ponds are preferred in July at the onset of the molt but when these ponds dry up the birds move to Deep-Arctophila (Class IV) ponds. These ponds are also used by broods and are preferred during staging in August (Derksen et al. 1981).

(2) Oldsquaw

Among North Slope ducks, the oldsquaw is the most abundant regular breeder (Gabrielson and Lincoln 1959). It was the second most abundant duck at study sites at Teshekpuk Lake when observed by Derksen et al. (1979a). Populations are relatively stable during June while breeders are establishing territories. Paired males begin leaving their mates in mid-July to congregate in coastal bays and lagoons. Hens and broods congregate on larger lakes to molt and stage for migration from late July through August (Derksen et al. 1981).

Oldsquaw congregate in spring on open water on large lakes and use Deep-Arctophila (Class IV) wetlands as they thaw. Breeding pairs disperse to smaller Shallow-Carex (Class II) and Deep-Arctophila (Class IV) ponds. During July, post-breeding and nonbreeding birds prefer Deep-Arctophila (Class IV) ponds and Deep-Open (Class V) lakes. Most broods are seen in those two wetland classes as well as Shallow-Carex (Class II) ponds. During the August molt and staging period, oldsquaw prefer Deep-Open (Class V) lakes (Derksen et al. 1981).

(3) Spectacled Eider

The most important breeding areas for spectacled eiders lies within NPR-A and these ducks were considered common breeders within the TLSA by Derksen et al. (1981). Habitat preferences of spectacled eiders are apparently similar to those of oldsquaw. Males leave the area by early July but females and broods stay through early August.

b. Tundra Swans

The highest densities of tundra swans on NPR-A occur southwest of Teshekpuk Lake and between Teshekpuk Lake and the Colville River (King 1979). King (1979) estimated that about 3,000 Tundra swans summer on NPR-A. These comprise approximately four percent of the eastern population of swans. This population winters in the vicinity of Chesapeake Bay.

Tundra swans arrive in NPR-A in mid-May and initiate nesting during the first week of June (Hawkins 1983). Hatching occurs during the second week of July after an estimated 30-day incubation period. Swans are flightless for 35 to 40 days during the molting period. Most swans have left the North Slope by mid-September.

Tundra swans use *Deep-Arctophila* (Class IV) and *Deep-Open* (Class V) lakes almost exclusively during the time they are present on the North Slope (Derksen et al. 1981).

Tundra swans are valued for viewing and photography throughout the U.S. and Canada, and are hunted in Montana and North Carolina.

c. Loons

(1) Arctic Loon

Arctic loons are a common nesting species on the arctic slope (Pitelka 1974) and are the most common loon within the TLSA, based on studies by Derksen et al. (1979a). Arctic loons preferred habitats that contained *Arctophila* *fulva* (Classes III, IV, and VII) according to Derksen et al. (1981). Bergman and Derksen (1977) noted 66% of the arctic loon nests they located were in Class IV (*Deep-Arctophila*) wetlands. Brood habitat included the *Arctophila* classes as well as *Shallow-Carex* (Class II) wetlands and *Deep-Open* (Class V) lakes (Derksen et al. 1981).

(2) Red-throated loons

Red-throated loons are less common than arctic loons. Red-throated loons were more common at sites within the TLSA studied by Derksen et al. (1979a) than at other sites on NPR-A. Apparently red-throated loons concentrate in areas near the coast because they feed their young with fish caught at sea (Davis 1972). This behavior was noted by Bergman and Derksen (1977) at Storkersen Point near Prudhoe Bay.

These loons use *Shallow* and *Deep-Arctophila* (Classes III and IV, respectively) wetlands and *Beaded Streams* (Class VII) according to Derksen et al. (1981).

d. Shorebirds

A variety of shorebirds are known to inhabit the TLSA during the summer. Derksen et al. (1979a) found higher densities of pectoral sandpipers, red phalaropes, northern phalaropes and long-billed dowitchers at study sites within the TLSA than at other sites in NPR-A. Shorebirds use many different habitat types depending on each species' preferences (Jones 1980), but are at highest densities within 20 miles of the coast. In late July and August, large lakes in the TLSA support flocks of thousands of phalaropes, and in August and September, staging shorebirds congregate in large flocks on *Coastal Wetlands* (Class VIII) and adjacent bays and lagoons of the Beaufort Sea (NPR-A Task Force 1979).

4. Discussion - Sensitivity to Impacts

a. Oil and Gas Exploration Activities

(1) Winter Activities

Winter exploration activities within the TLSA can be conducted with minimal impacts to the waterbird communities if such activities are properly planned, are conducted within the stipulations presently used on NPR-A (Appendix II), and are closely monitored to ensure adherence to stipulations.

(a) Cross-country Transportation

Winter cross-country travel, in association with geophysical survey or transportation of drilling equipment or supplies, can be conducted with minimal impacts if stipulations requiring adequate snow cover, freeze depth and minimal disturbance of surface vegetation are closely adhered to. There may be some effects on the vegetation, such as compression of the vegetation mat. Although the effects are thought to be minimal and primarily visual (Abele et al. 1978), long-term effects on wetland habitats are not completely understood. Avoiding important wetlands (Bergman et al. 1977), such as foraging areas adjacent to lakes used by molting geese (Derksen et al. 1982), and routing as much traffic as possible to upland areas or on frozen lakes, will probably minimize effects of cross-country travel on wetland habitats.

Improper cross-country travel can have a myriad of effects and examples of past adverse impacts exist throughout the North Slope. It is imperative that operators be aware of their potential to impact surface resources, conduct their activities within stipulated limits, and be closely monitored to ensure adherence to stipulations.

(b) Exploratory Drilling

Exploratory drilling can be conducted with minimal impacts on wetland habitats. Use of ice pads rather than gravel pads can minimize surface disturbance. Since present drilling technology allows some flexibility in the siting of drilling facilities, wetlands can be further protected by locating drilling operations on upland areas whenever possible and environmentally preferable.

The potential for contamination of wetlands exists with any drilling activity since a variety of hazardous substances, such as crude oil, various fuels, drilling muds and other liquid and solid wastes are present at such sites. Among the most toxic components are polyaromatic hydrocarbons, such as napthalenes; and a wide spectrum of heavy metals, such as arsenic, chromium, manganese, lead, mercury, copper and zinc. Brine may also severely affect wetland vegetation and aquatic life, as may special biocides used in drilling. These contaminants have wide-ranging impacts on the habitats present at the drilling site, as well as throughout the downstream watershed. Animals using the area can suffer from a variety of physical, physiological and ecological problems as the result of contamination. Both Avoiding drilling sites on wetlands whenever feasible and providing adequate protection against the possibility of contamination are necessary considerations. These contaminant problems can be reduced by requiring adequately sized reserve pits, using impermeable pit walls, winter capping of exploration pits, and backhauling or reinjection of fluids. Stipulations to protect against contamination are currently in force on all NPR-A activities but accidents and low-level contamination could occur.

(c) Pads, Roads and Airstrips

These types of facilities are necessary for most oil and gas activities on NPR-A. These temporary facilities can be constructed within present stipulatory limits with minimal impacts on wetland habitats if properly planned, built, maintained and rehabilitated.

Pads, roads and airstrips associated with temporary exploratory activity in the TLSA will likely be built of ice or manufactured materials, such as foam insulation or timbers, since gravel resources are limited in the area and there are fewer environmental impacts with these construction methods. If, however, the pads, roads and airstrips are built of gravel materials, then the potential impacts would be similar to those of permanent facilities and the impacts will be discussed under the oil and gas development activities section. Of concern in developing these temporary facilities is the amount of water necessary to construct the ice pads, roads and airstrips associated with exploratory wells. Water drawdown can have impacts on the lake and adjacent wetlands. Water withdrawal from lakes can also impact fish populations and in turn, subsistence harvest activities. This is less of a concern on deeper lakes where high volumes of water can be used without affecting depth, but excessive drawdown can significantly affect smaller lakes and ponds. Proper selection of water sources and estimation of water needs can eliminate this problem.

Large lakes are often used as airstrips during winter activities on the arctic slope since site preparation is minimized. Although the presence of the airstrip has minimal effects, there is a potential for contamination of the lake since fuels, drilling muds and other contaminants are transported by aircraft. Stipulations presently in force on NPR-A minimize the potential for lake contamination through storage of hazardous materials off the lake ice and by adhering to spill prevention and control plans.

In the limited areas of the TLSA that have sufficient gravel or sand resources, it is conceivable that use of these materials for exploration facilities will be requested. Use of gravel or sand will have obvious effects at the site of operation as well as at the material source (Woodward-Clyde Consultants 1980). Material sites cannot be rehabilitated sufficiently to restore wetland values and consequently, gravel and sand should only be used when ice pads are not feasible for temporary facilities. Impacts of gravel and sand construction will be discussed in the following section entitled "Oil and Gas Development Activities" since it is more pertinent to permanent facilities.

(2) Summer Activities

Because of the importance of wetland habitats in the TLSA to waterbirds, it is reasonable to assume that the present wildlife conservation stipulation pertaining to waterbirds (BLM 1983b) will be applied to most, if not all, potential lease tracts. The stipulation, as presented for the most recent lease sale (BLM 1984), states that "operations between May 20 and August 25" will be prohibited in order to protect important waterbird (duck, goose, swan) and shorebird nesting, molting and staging habitats." Although this stipulation is appropriate in intent, the Phase 1 Waterbird Working Group (Appendix I) feel that the period of restriction should be extended to "between May 1 and September 30" to accommodate both the arrival of nesters and the end of the staging period. Further discussion of exploration impacts assumes that this extended seasonal restriction will be in force.

Disturbance of waterbirds by aircraft may be the most important chronic impact presently affecting these populations of NPR-A during the summer. It is a difficult problem to control because of the many private flights over the area and the difficulty of enforcing stipulations on permits. However, BLM permits require that no flights below 1,000 ft. Above Ground Level (AGL) will be allowed over important waterfowl habitats unless doing so endangers human life or safe flying practices.

Because development activities require much more aircraft traffic than exploration activities, impacts associated with aircraft disturbance will be discussed in detail in the oil and gas development activities section.

b. Oil and Gas Development Activities

Predicting the effects on waterbirds and their habitats from placement of an oil production facility or facilities within the TLSA is extremely difficult. Impacts will vary greatly with location, size and the amount of activity. However, it is safe to predict that if high value habitats for waterbirds are impacted, then their value to those waterbirds will be reduced. Even operations that can be completely shut down during important periods of waterbird use will affect the habitat values of those areas and consequently affect waterbird values. According to the NPR-A Caribou/Waterbird Impact Analysis Workshop (Gilliam and Lent 1982): "The panel felt development in this area," Teshekpuk Lake "regardless of the type (permanent roads from Camp Lonely at Pitt Point or from the Arctic Slope Regional Corporation lands at Cape Halkett; or even oil field development capable of complete shut down and evacuation during July) would be unacceptable when weighed against the almost certain displacement of molting geese." The Phase 1 Waterbird Working Group also came to a consensus that if oil and gas development was to occur within the northern portion of TLSA, it would not be possible to maintain the waterbird resources of the area using current industrial technologies.

Since some impacts are unavoidable, it may not be reasonable to allow development in some crucial areas if protection of biological values is to be maximized. In other important but less crucial areas, impacts to wetlands and their waterbird residents can be minimized by limiting development to only the essential facilities, with support facilities placed elsewhere.

(1) Alteration of Habitats

Placement of facilities necessary to develop a petroleum field can have many adverse effects on wetland habitats. Proper planning and design, preferably with realistic projections of facility needs throughout the life of the field, can minimize these impacts to a degree. Proper construction and maintenance of facilities are also necessary.

The most obvious impact of oil and gas development is the loss of habitat due to filling with gravel or sand for pads, roads and airstrips. The Army Corps of Engineers estimated that as of 1983, 7,200 acres of wetlands have been filled in the Kuparuk and Prudhoe Bay oilfields (J. Nolke, FWS, personal communication). Each pad covers approximately five to 10 acres and each mile of road accounts for four to five acres. This results in loss or change in wetland habitats at both the construction site and at the material source. Gravel removal from bars along large lakes in the TLSA could greatly increase cutting action by water, ultimately resulting in the drainage of these lakes (Weller and Derksen 1979).

Development of gravel roads, pads and airstrips could affect drainage patterns in wetland habitats. The characteristics of sheet flow and cross drainage, which are both important in maintaining the integrity of these habitats, are poorly understood. Coastal wetlands are maintained by periodic influx of salt water during storm tides. This effect will be difficult to sustain unless properly engineered and located roads and pipelines with adequate drainage are utilized.

To date, use of culverts in existing development areas has not ensured adequate drainage and has resulted in impoundments of water. Such impoundments often convert productive wetlands into deep-water unvegetated lakes that attract few birds. Since 1969, over 150 miles of road have been constructed in the Prudhoe Bay field, resulting in 45 square miles of impoundments that generally occur during breakup each year. That amounts to an average of 192 acres per road mile (J. Nolke, FWS, personal communication). At the very least, water backs up at culverts blocked by ice in the spring when the snow begins to melt. Building all facilities on pilings may also affect drainage, since drifted snow under and adjacent to these facilities will melt slowly and may impede water flow. The effects of altered drainage on wetland habitats are difficult to predict. At the very least, some areas will be wetter and others drier than before development, as is obvious along the arctic sections of TAPS. However, the prospects for significant deleterious effects are greatest in the coastal wetlands since periodic influx of salt water will be difficult to maintain when road and facility developments are in place.

(2) Disturbance

(a) Aircraft

The impacts of aircraft overflights on waterbirds are exceedingly difficult to assess. Responses by birds may vary among species, populations, flocks and individuals, as well as between different habitats or different times of the year. Characteristics of the overflight, such as altitude, horizontal distance, type of aircraft, duration of disturbance, engine noise volume and the amount of previous aircraft disturbance, will affect the response elicited by waterbirds. Most of the limited existing information on aircraft disturbance of waterfowl has attempted to evaluate the effects of these characteristics on waterbird responses (Simpson et al. in prep., Derksen et al. 1979a, Schweinburg 1974, Schweinburg et al. 1974, Gollop et al. 1974a, 1974b, Salter and Davis 1974). The information is somewhat inconclusive, but some inferences can be drawn.

The intensity of response by waterfowl is related to the altitude and/or horizontal distance to the aircraft. In general, the lower and closer the aircraft, the greater the disturbance response (Derksen et al. 1979b). However, it is difficult to select a minimum altitude that will eliminate or minimize the disturbance. Overflights at Izembek Lagoon were permitted at a minimum altitude of 1,500 ft. AGL, which was not enough to avoid disturbing black brant staging there (L. Trasky, ADF&G, personal communication). Derksen et al. (1979a), working on molting geese at Teshekpuk Lake, stated that single-engine aircraft below 2,000 ft. AGL elicited the maximum response, but of 10 overflights only one, estimated at over 5,000 ft. AGL, did not induce a response. Salter and Davis (1974) reported staging snow geese responding to an overflight at 10,000 ft AGL.

Greater horizontal distance of an aircraft to waterfowl will decrease the intensity of the disturbance; however, a high degree of variability has been noted in related literature. Derksen et al. (1979a) reported an instance where a helicopter estimated at six miles distance from a flock of molting brant and Canada geese produced an intense response. Salter and Davis (1974) mentioned staging snow geese being disturbed nine miles away from overflying aircraft.

Different types of aircraft disturb waterfowl to different degrees. Helicopters disturb waterfowl more than other types of aircraft (Simpson et al. in prep., Derksen et al. 1979a). This may be due to differences in engine noise or the lower altitude at which helicopters tend to fly.

The results of sustained aircraft disturbance are not known. It is conceivable that some waterfowl can become accustomed to aircraft; however, this may require continued low-intensity association with the disturbing element, which may not occur with aircraft overflights. Aircraft flights over an area occur somewhat randomly and vary greatly in the intensity of disturbance produced, so resident waterfowl do not have the opportunity to become accustomed to the disturbance. Owens (1977) reported wintering brant using areas that provided constant disturbance only after forage was depleted in other areas and that brant may have become more sensitive, rather than less, with continued exposure to disturbance.

Characteristics of the birds may also affect the degree to which they respond to aircraft. Waterfowl that have migrated long distances to an isolated location to molt may respond to the greatest degree. During the molt, they are flightless, very vulnerable to predators, and therefore extremely wary. Characteristics of habitat that allow them to detect and evade predators are important criteria for selecting habitat during this time. Since the response to aircraft is similar to the response to predators, it follows that aggregations of molting waterfowl will be extremely sensitive to aircraft-related disturbance. However, nesting individuals of some species, which react to predators by remaining hidden, may not respond overtly to aircraft.

The ultimate effects of continued disturbance on individuals and populations of waterfowl are more difficult to determine than the characteristics of the disturbances that effect the response. Chronic disturbance may result in abandonment of an area by waterfowl or may manifest itself in several other ways.

Continued aircraft disturbance may result in nest abandonment and/or increased predation on nests. Adults that are being flushed sporadically will spend less time on the nest and, because of their flight response, will make the nest more conspicuous to predators. Energy expenditure by the adults may make continuing a nesting attempt unreasonable, leading to nest abandonment. Flushing of incubating or brooding adults may lead to hatching failure or the loss of young.

The ultimate effects of the energy loss associated with disturbance are difficult to assess. A disturbed bird is not only expending more energy than normal, but the period of disturbance represents valuable time away from feeding or other essential activities. This can ultimately affect the maintenance of fat reserves.

Molting birds may be at a particular disadvantage when continuously disturbed. As noted earlier, it is likely that their response to disturbance may be greater. Since they are flightless, they cannot move away from areas of chronic disturbance without walking overland, which makes them highly susceptible to predators. They arrive at the molting area with depleted energy reserves from spring migration and aborted nesting/brood-rearing activities and must take in sufficient forage to rebuild fat reserves and replace molted feathers. In addition, because of inclement weather, they are often cold-stressed (Simpson et al. in prep.). Simpson et al. (in prep.) proposed that low energy reserves may retard feather replacement and delay a bird's ability to move to coastal wetlands to stage for migration. Birds with less than optimum fat reserves may either depart the North Slope later or leave in poorer condition, either of which will affect their chances of successfully migrating to wintering areas.

Several options are available to protect important waterfowl populations utilizing the TLSA from the effects of aircraft disturbance. The first is eliminating overflights or increasing the minimum flight altitude from the present 1,500 ft. AGL to 5,000 ft. AGL over important habitats during crucial periods, such as May 1-August 15 over lakes used by nesting and molting geese and August 1-September 30 over coastal wetlands used by staging waterbirds. This would help reduce the amount of disturbance. The second is the designation of flight corridors that concentrate aircraft flights over less crucial habitats and would aid in minimizing aircraft disturbances. This strategy may be particularly applicable to "site-specific" activities requiring repeated flights between the activity and a supply point.

Because the impacts of aircraft disturbance previously discussed are from a limited number of reports, further flight altitude disturbance studies need to be undertaken. Until there is a better understanding of aircraft disturbance on the energetics of waterbirds, especially large concentrations of molting geese, it is the conclusion of the Phase 1 Waterbird Working Group that the present 1,500 ft. AGL be increased to 5,000 ft. AGL in order to provide adequate protection for waterbirds during the interim period.

A developed facility will, in most cases, require much more aircraft traffic than exploration activities, and has the potential to impact wildlife to a much greater degree. In some important areas, it may be necessary to prohibit development of airstrips and/or exclude the use of aircraft during crucial periods.

(b) Ground-Level Activity and Noise

Human activity associated with construction and operation of a facility will affect waterbird use of the area. Even facilities capable of complete seasonal shutdown will require some maintenance during crucial periods of wildlife use, although human disturbance could be minimized using this strategy. In important areas for wildlife, human disturbance can be decreased by completing construction activities during winter since construction is characterized by a higher degree of human activity than actual operation of a facility. However, limiting construction activities to specific seasons may not be totally adequate, because even minimum maintenance and operations in some areas could cause disturbance to this high value goose molting habitat. Both the NPR-A Caribou/Waterbird Impact Analysis Workshop (Gilliam and Lent 1982), and the Phase 1 Waterbird Working Group (Appendix I) believe that this type of strategy will not afford an adequate level of protection to waterbirds in the northern portion of the TLSA.

Noise associated with operating a facility can disturb waterbirds in the area. Experimental use of gas compressor noise simulators in areas used by staging snow geese was responsible for displacement of feeding geese within three miles of the simulator (Gollop and Davis 1974).

(3) Contamination

An oil producing facility is a potential source of low-level contamination by oil, drilling muds, fuels, solid wastes, dust, etc. There also is the potential for accidental spills of greater magnitude. Contamination of any type can be a particular problem with coastal facilities. The degree to which long-term exposure will affect wildlife habitats and the species using them is poorly understood compared to the effects of more catastrophic spills. Because it may take many years for this long-term exposure to manifest itself, impacts associated with this type of low-level contamination may, in fact, be more deleterious to biological resources in the long term than a single, major spill.

Hazardous substances may pollute wetlands through a variety of sources including direct discharges into tundra; surface drainage following road "oiling" for dust control; wind blown contamination; and leaching, overtopping, or breaching of pit walls, particularly during spring flooding.

Such contamination is not uncommon. For example, in 1984 more than 57,899,000 gallons of reserve pit fluids were discharged directly into Prudhoe Bay wetlands under State permits (J. Nolke, FWS, personal communication). Of the 21 pits for which effluent data were fully reported to the Alaska Department of Environmental Conservation, 20 pit discharges violated one or more of the effluent standards. In addition to this effluent discharge, an unspecified additional volume of pit fluid is used to oil roads each year. These statistics indicate the potential of hazardous problems arising with waterbirds and/or the habitats they utilize.

Because of low temperatures and shallow, wind-mixed conditions of arctic lakes and wetlands, contaminants are not readily degraded or evaporated. For example, after five years, oil in a contaminated pond at Prudhoe Bay had virtually the same chemical composition as the original spill, with only minor loss of lower-weight hydrocarbons (Barsdate et al. 1980).

Contamination from reserve pits can lead to death or low productivity of emergent vegetation consumed by waterfowl in the summer. Contaminants have been shown to drastically reduce the abundance and diversity of aquatic invertebrates consumed by many shorebirds and waterfowl. For example, the FWS has found that a distinct gradient in species diversity occurs between reserve pits, adjacent ponds, distant ponds and remote ponds (J. Nolke, FWS, personal communication). Reserve pits are devoid of aquatic invertebrates and adjacent ponds are extremely low in species diversity. This information suggests that active transport of contaminants between reserve pits and ponds occurs, perhaps via troughs in polygonized tundra or surface flooding in the spring.

(4) Direct Mortality

Mortality of waterbirds could increase in an oil development area. The significance of this increase is difficult to predict. Mortality can be divided into different causes, such as contamination, collisions and increased predation by both humans and natural predators.

Direct mortality of waterbirds by contamination will include oiled birds, as well as birds ingesting lethal doses of hazardous substances. In addition, indirect effects on waterbird populations can be expected to be manifested in lower productivity of contaminated birds, lower survival of contaminated young or young of adults affected by hazardous substances, and lower survival rate of adults that ingest sublethal doses of hazardous substances.

Collisions with vehicles, aircraft, buildings, navigation towers, pipelines and powerlines will occur in any facility, particularly during periods of fog. This mortality is difficult to estimate and will depend greatly on location and size of the facility, as well as use of the specific area by waterfowl.

An oil-producing facility and the garbage it produces will attract predators and scavengers such as arctic fox (Eberhardt et al. 1982), gulls and jaegers (Gilliam and Lent 1982). This increased predator population will increase nest predation and direct mortality of waterbirds, and it will likely increase avoidance of the area by waterfowl. In addition, concentrations of avian scavengers, such as gulls, can lead to the transmission of diseases such as avian cholera to waterbird species (Gilliam and Lent 1982).

Legal sport hunting can be eliminated from an oil development area by regulation or stipulation, although an unknown amount of poaching could potentially occur. Due to the tight controls placed on the employees within oil development areas (Prudhoe Bay and Kuparuk for example), poaching by individuals working within these areas, if any is probably very limited. However, the access that oil and gas roads, pipelines, and airstrips provide could increase the amount of poaching by individuals from outside the area. Also, access developed for a facility may improve ingress into the area for local subsistence users who harvest birds and collect eggs.

c. Range-wide Implications

The TLSA is a unique and internationally significant wetland ecosystem. It is the largest known molting resort for concentrations of nonbreeding geese on the arctic coast of North America and Siberia (Derksen et al 1979b). The coastal wetlands of the area and associated bays and lagoons of the Beaufort Sea support a large, significant assemblage of geese, ducks and shorebirds during the fall staging period. This area supports greater densities of waterfowl than elsewhere in NPR-A and, for that matter, in the entire Alaskan Arctic Coastal Plain.

The impressive waterbird values of the TLSA have been recognized throughout all the data collection and analysis projects associated with management of oil and gas activities on NPR-A (NPR-A Task Force 1979, Gilliam and Lent 1982, BLM 1983a), and were responsible for its designation as one of three Special Areas within NPR-A. If oil development is authorized in the TLSA, it is imperative that these values be adequately protected. However, the NPR-A Caribou/Waterbird Analysis Workshop (Gilliam and Lent 1982) and the Phase 1 Waterbird Working Group do not believe that it is possible to develop an oil field in the northern portion of TLSA and still maintain the present waterbird values.

Oil and gas activities in the TLSA will affect waterbird populations that are utilized by citizens of five countries including the U.S., Canada, Mexico, Japan and the USSR. The U.S. has treaty obligations with these countries to provide for continuation of healthy populations of waterfowl that reside temporarily within our boundaries. There is presently a great deal of concern over black brant populations and any activities in the TLSA will affect molting brant (an average of 18% of the brant population) as well as an unknown but substantial number of migrating black brant from eastern Alaska and the Canadian arctic. The international implications of land management decisions concerning oil and gas development within the TLSA cannot be ignored.

5. Important Habitats By Priority

a. Goose Molting Habitat

The area to the north and east of Teshekpuk Lake (Figure 4) has annually supported an assemblage of four goose species (black brant, Canada, white-fronted, and snow geese) that have numbered up to almost 60,000 birds in some years. This is the only known molting concentration of its kind in arctic North America or Siberia, and includes an average of 18% of the world's Pacific black brant population and 20% of the population of two subspecies of Canada geese in the Pacific Flyway. Geese using this area inhabit four countries, including the U.S., Canada, Mexico and the USSR during some portion of their migratory cycle. The U.S. has treaty obligations with all these countries to maintain healthy productive waterfowl populations for the enjoyment of citizens of all countries these species inhabit.

There presently is concern over the low population level of Pacific black brant. Sport hunting of this species has been virtually eliminated and efforts have been made to curtail the subsistence harvest. Important habitats used by this species must be protected so that it can rebound to productive levels.

It is doubtful that molting geese, due to their high vulnerability and resulting wariness during this flightless period, will remain in the vicinity of oil and gas development activities. The ultimate impacts of this habitat loss are difficult to predict but increased activities in other areas have resulted in displacement of geese (Sterling and Dzubin 1967, Owens 1977). This displacement of geese could potentially result in a population decline if the displaced waterbirds are unable to find and use alternative molting and staging habitats. This could be particularly critical for black brant due to their large concentrations within TLSA, and because the population is already experiencing a serious decline.

b. Coastal Wetlands (Class VIII)

The salt-influenced wetlands along the coast of the TLSA (Figure 9), and within the goose-molting habitat, are of crucial importance to waterbird populations using the TLSA and adjacent areas of NPR-A, as well as to migrants traveling through the area. These areas provide most of the habitat for staging geese. They support large numbers of shorebirds (Figure 10) and ducks throughout the summer. These wetlands, with their associated bays and lagoons of the Beaufort Sea, support great populations of many waterbirds including black brant, Canada geese, ducks, shorebirds and seabirds during the late summer-early fall period when these species are preparing for their southward migration. Habitats such as these, which provide necessary forage for these species to build energy reserves for fall migration, are essential.

These salt-influenced wetland habitats are maintained by periodic influx of sea water, primarily during storm tides. The hydrologic properties of this habitat are poorly understood and it is doubtful that construction of an oil development facility or port facilities and associated roads can be accomplished without impairing the habitat characteristics of these wetlands.

c. Tundra Swan Nesting Habitat

The highest densities of tundra swans on NPR-A occur southwest of Teshekpuk Lake and south of the Kogru River (Figure 11). Swans are extremely sensitive to disturbance and these areas require protection in order to maintain their importance as swan nesting habitat.

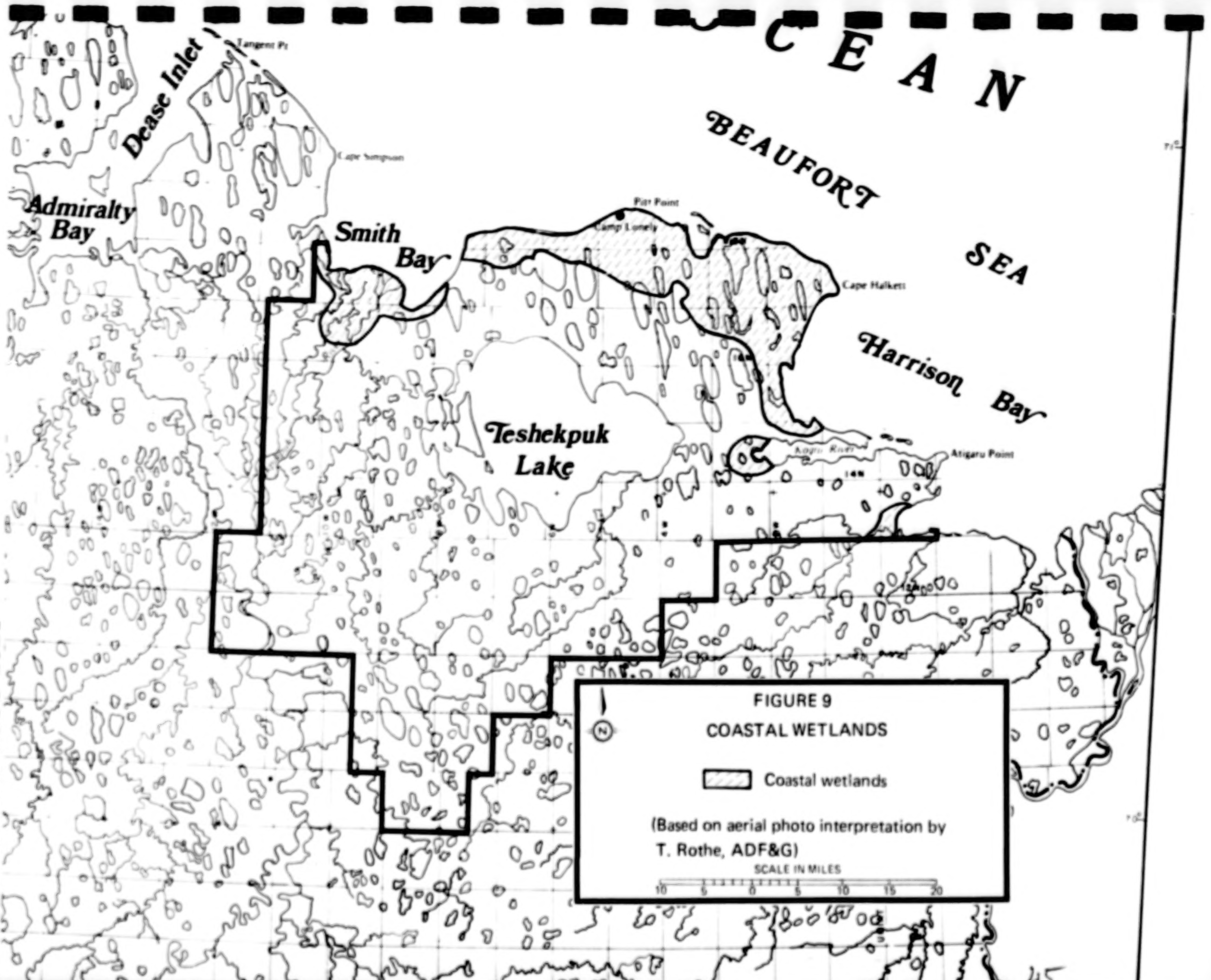


FIGURE 9

COASTAL WETLANDS

▨ Coastal wetlands

(Based on aerial photo interpretation by T. Rothe, ADF&G)

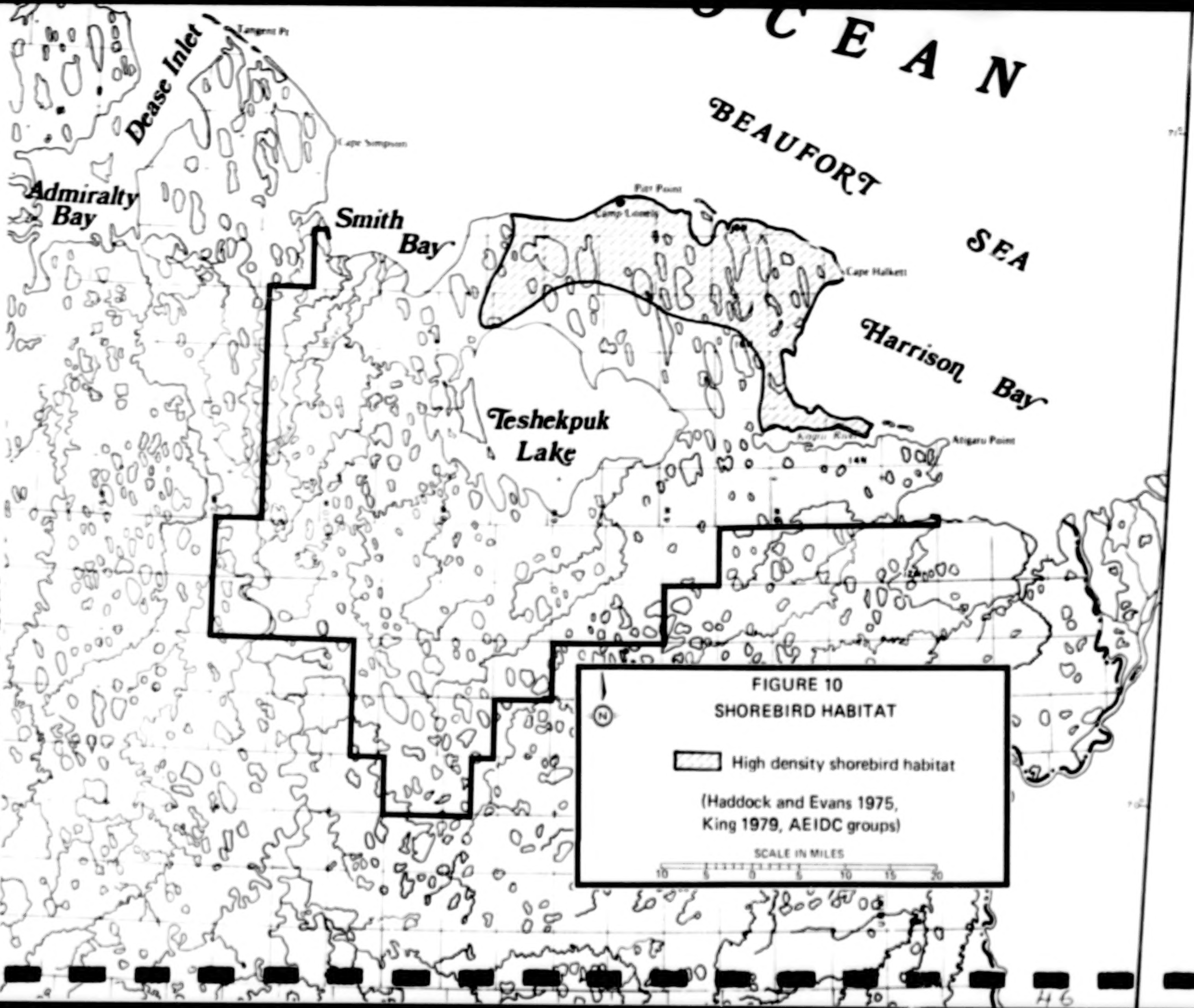


FIGURE 10
SHOREBIRD HABITAT

▨ High density shorebird habitat

(Haddock and Evans 1975, King 1979, AEIDC groups)

BLANK PAGE

BLANK PAGE

BLANK PAGE

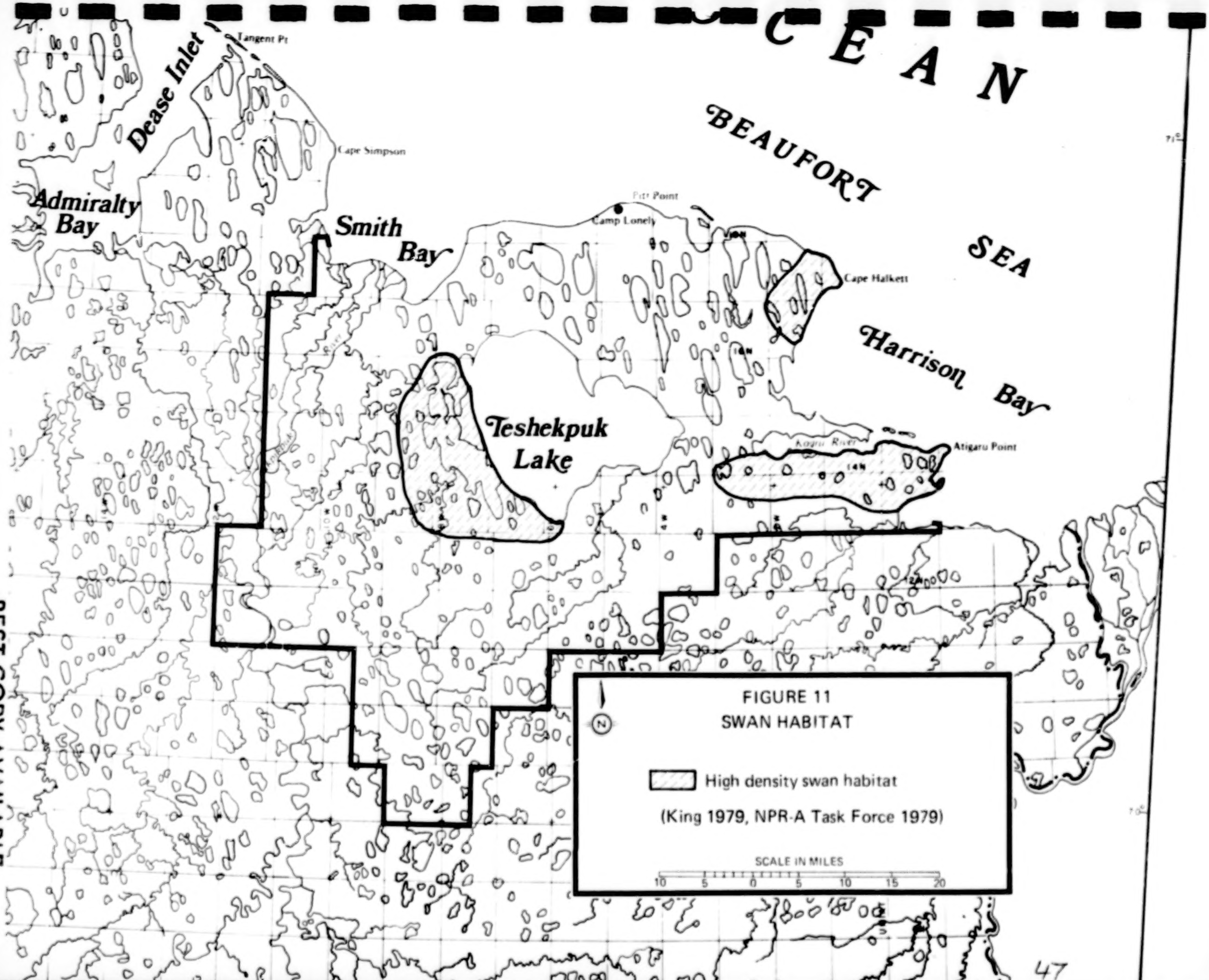


FIGURE 11
SWAN HABITAT

d. High-Density Duck Habitats

A large percentage of habitats that support high densities of ducks (Figure 12) are included within the areas already discussed. The high-density areas support greater than 50 ducks per square mile in normal years and even higher numbers in years when drought-displaced pintails are present (118 pintails per square mile). It is important to protect not only the areas that annually support large populations of waterfowl, but also those habitats important in drought years that stress breeding populations in important southern production areas. By providing for these displaced ducks, which are potential breeders, we ensure the long-term stability of these populations.

e. Wetland Habitats (Classes II-VII)

Wetland habitats throughout the TLSA support important waterbird populations during the summer period (Table 4) and extreme caution must be used if oil and gas development is to occur. Important wetlands (Classes II-VII, Coastal Wetlands (Class VIII) have been discussed previously) probably cover 30-50% of the surface of the TLSA. By mapping these wetland habitats prior to development, it will be possible to locate facilities in less important habitats when feasible and minimize the impacts to these important ecological communities.

6. Waterbird Protective Measures

The biological values of the TLSA for waterbirds, as described throughout this section, are sufficiently significant to justify strict protection of these values. Any oil and gas exploration and other development activities that occur must be: 1) compared with the biological values present in the specific area, 2) well-designed with reasonable estimates of development needs throughout the life of the field, 3) strictly controlled to ensure protection of important biological values, and 4) closely monitored to guarantee adherence to stipulations. However, the NPR-A Caribou/Waterbird Analysis Workshop (Gilliam and Lent 1982), and the Phase 1 waterbird working group do not believe that it is possible to develop an oil field in the northern portion of TLSA and still maintain the present waterbird values.

The TLSA can be divided into three areas based on waterbird values and sensitivity to petroleum-related activities (Figure 13). The following discussion provides protective measures for waterbirds from possible oil and gas leasing and other development activities.

Area 1 (Figure 13) contains most of the important molting and staging habitat for black brant, as well as nesting, molting and staging habitats for other geese, ducks, swans and shorebirds. Most of the coastal wetlands in the TLSA are included in this area. This portion of the TLSA should be managed to conserve the important wildlife populations using this unique area. Because of their large concentrations within TLSA, black brant and other goose species are very susceptible to disturbance during molting and staging with even low levels of human activity. Because of this susceptibility, allowing any activity that is not conducted according to the

BEST COPY AVAILABLE

BEST COPY AVAILABLE

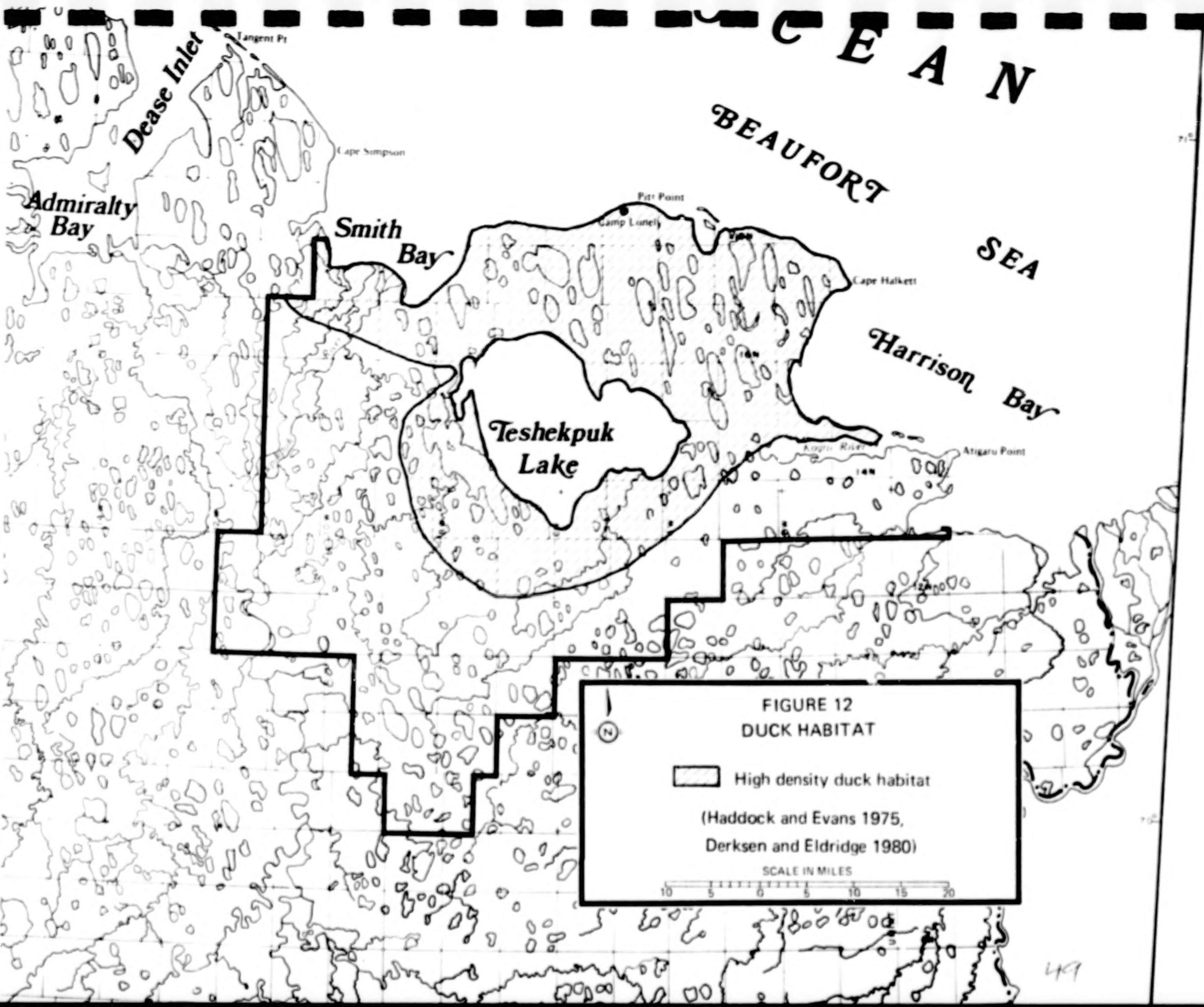


FIGURE 12
DUCK HABITAT

▨ High density duck habitat

(Haddock and Evans 1975, Derksen and Eldridge 1980)

TABLE 4*

Use of Wetland Classes by Important Waterbird Species and Groups within the Teshekpuk Lake Special Area, NPR-A, Alaska

	Wetland Classes							
	I	II	III	IV	V	VI	VII	VIII
Black Brant				X	X	X	X	X
Canada Geese				X	X	X	X	X
White-fronted Geese	X	X	X	X	X	X	X	X
Snow Geese	Insufficient Information							
Ducks		X	X	X	X			
Tundra Swans			X	X	X			
Loons		X	X	X	X		X	
Shorebirds	X	X	X	X	X	X	X	X

* Derksen et al. (1979a) - taken from (Bergman et al. 1977)

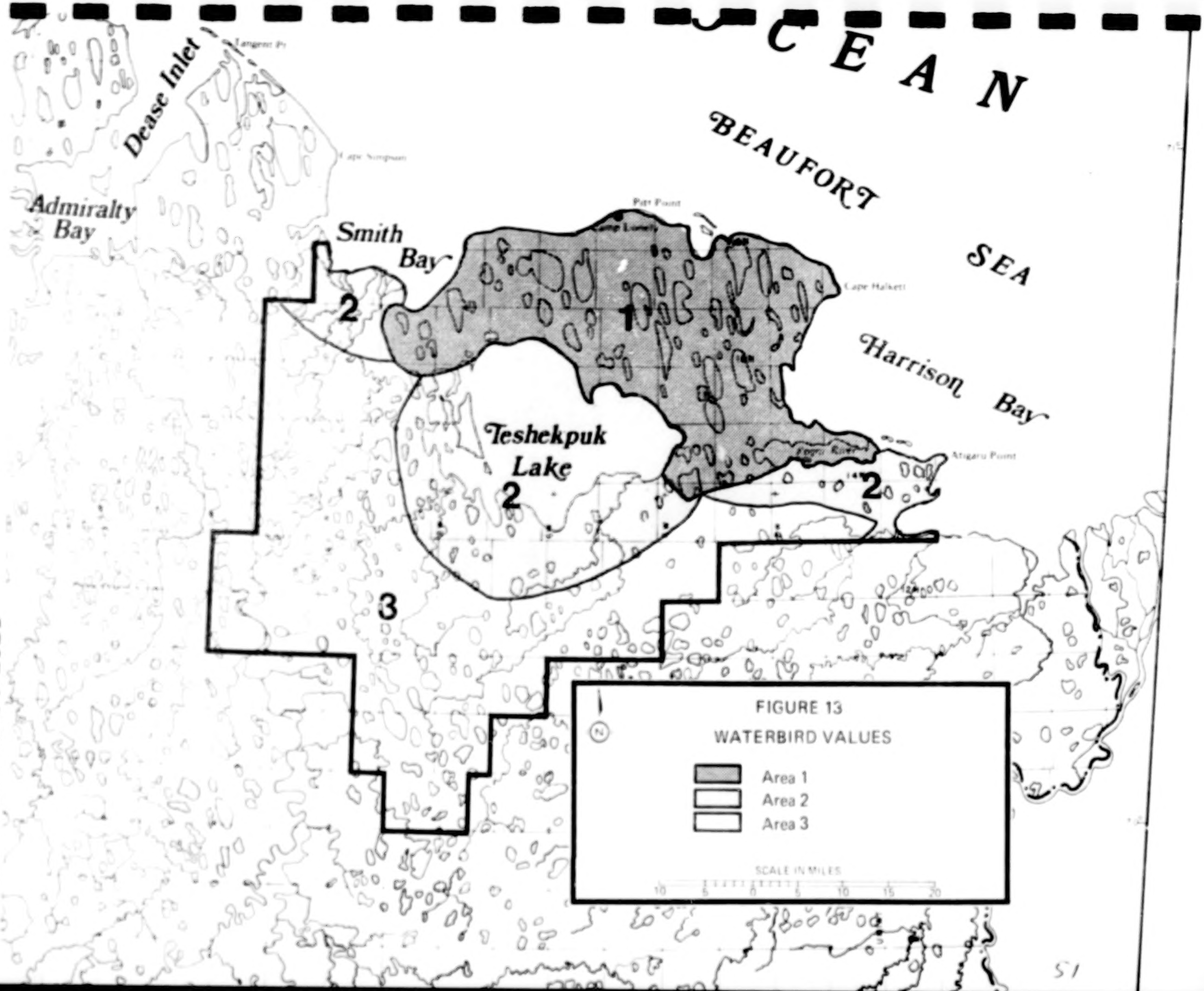


FIGURE 13

WATERBIRD VALUES

following protective measures would result in impacts that could alter the present use of the area by waterfowl and other wildlife species. The NPR-A Caribou/Waterbird Analysis Workshop (Gilliam and Lent 1982) and the Phase 1 waterbird working group both believe that oil and gas development in Zone 1 is not compatible with the maintenance of the area's waterbird resources. This area should remain in public ownership and no permanent facilities, such as roads, powerlines, pipelines, airstrips, etc. (excluding Camp Lonely), should be permitted within it. BLM should make every effort to acquire private lands within the area through trades and purchases. In addition, aircraft should either avoid flying over the area or maintain an altitude of 5,000 ft. AGL from May 1 to September 30. Temporary activities which do not disturb or contaminate the land's surface may be allowed during the period October 1 to April 30.

Protective Measures

- All ground-level activity would be restricted solely to October 1 through April 30, excluding Camp Lonely and authorized scientific studies.

- Do not allow habitat alterations or disturbances including but not limited to dredging, filling and excavating. (Note: winter geophysical exploration, with appropriate stipulations and adequate snow cover, would not be considered surface-disturbing.)

- No permanent facilities, including but not limited to roads, pads, camps, airstrips, compressor stations and pipelines (excluding Camp Lonely) would be allowed.

- Require aircraft to either avoid the area or maintain an altitude of 5,000 ft. AGL from May 1 to September 30. Flight corridors may have to be established to eliminate impacts to waterbirds.

- No land exchanges within the TLSA should be allowed and BLM should make every effort to acquire the Cape Halkett lands within Zone 1 so land management can be provided to a continuous block of land which has crucial biological and subsistence values.

Area 2 (Figure 13) includes the high-density habitats used by geese, ducks and swans for nesting, molting and staging, which fall outside of Area 1. As with Area 1, this area should be managed to conserve the important wildlife populations that inhabit the area.

Exploration could occur with little or no disturbance to waterfowl, but the same is not true of development. Leasing essentially guarantees development if there is a discovery. Development as we know it today will disturb the waterfowl because permanent facilities and year-round activities are necessary in a developing and/or producing field. Should both high national interest in leasing and development and high potential for discovery of oil and gas be enough to warrant leasing within Zone 2, the following measures would be necessary to provide an adequate level of protection to these significant waterbird values.

Protective Measures

- Fill or excavation, including gravel extraction, would be allowed in Class I wetlands and upland habitats. No fill or excavation would be allowed within Class II-VIII wetlands.

- Construction of roads, pads, pipelines, facilities, etc. would be limited to October 1 thru April 30. Routine maintenance, production and transportation will be allowed year-round.

- Local service roads and corridors would be permitted for the production and maintenance of a producing field, but no regional transportation or utility corridors would be allowed.

- Unless environmentally preferable, permanent airstrips or heliports would be prohibited.

- Permit only temporary roads or facilities during the exploratory phase.

- Facilities essential to the production and transportation of oil from Area 2 would be permitted in Class I wetlands and upland habitats. Facilities would not be permitted in Class II - VIII wetlands unless no other reasonable alternative exists. Unless deemed essential, facilities with a high level of disturbance or pollution risk would not be permitted.

- The natural drainage patterns would be identified prior to, and maintained during, the construction of roads, pipelines, pads and other facilities. Culverts, bridges and other such drainage structures will be installed where needed to maintain natural drainage patterns. Where natural drainage patterns have been altered by facility placement, retrofitting within one season to correct drainage problems would be required.

- Require aircraft to maintain an altitude of 5,000 ft. AGL from May 1 to September 30. Flight corridors may have to be established to minimize impacts to waterbirds.

Area 3 (Figure 13) constitutes the remainder of TLSA. Although biological and subsistence values are still high within Zone 3, oil and gas exploration and development activities can be allowed within this area. The following protective measures would minimize disturbance to the waterbird values within the area.

Protective Measures

- Fill or excavation for siting of facilities would be allowed in Class I wetlands and upland habitats. No fill or excavation would be allowed within Class II-VIII wetlands if reasonable alternatives exist for siting of facilities outside of these areas.

- Construction of roads, pads and facilities should be accomplished between October 1 and April 30 to the maximum extent possible. Routine maintenance, production and transportation would be allowed year-round.

- Permit only temporary roads or facilities during the exploratory phase.

- The natural drainage patterns would be identified prior to, and maintained during, the construction of roads, pads, pipelines and other facilities. Culverts, bridges and other such drainage structures will be installed where needed to maintain natural drainage patterns. Where natural drainage patterns have been altered by facility placement, retrofitting within one season to correct drainage problems will be required.

- Require aircraft to maintain an altitude of 5,000 ft. AGL from May 1 to September 30. Flight corridors may have to be established to minimize impacts to waterbirds.

- All of the BLM's existing biological and cultural lease terms and conditions (Appendix II) would apply to Zone 3.

B. Caribou

The Teshekpuk Caribou Herd has only been recognized as a distinct herd, separate from the Western Arctic Herd and Central Arctic Herd since the mid 1970s. Information concerning the Teshekpuk Caribou Herd is limited, with most of it being gathered since 1981. The following section will summarize the current information available on the TH, and outline additional studies proposed to gather further baseline data needed to properly manage this caribou population.

1. Existing Distribution and Habitat Use

The estimated population of the Teshekpuk Lake Caribou Herd has varied from survey to survey over the last several years. This is primarily because until July of 1984 there had never been a systematic photographic census conducted over the area. Davis and Valkenburg (1979) estimated approximately 3,000 to 4,000 caribou inhabited the area around Teshekpuk Lake in the 1978 survey. Reynolds (1982) estimated the population of the area to be approximately 3,000. In 1982, following a post-calving aggregation survey by the BLM, the population was estimated to be approximately 4,000 animals. In July of 1984, the Alaska Department of Fish and Game and the BLM conducted an intensive aerial photographic census over the Teshekpuk Lake area to accurately determine herd size. This census indicated that there are at least 11,800 animals within the Teshekpuk area. This increase over the previous population estimates is not uncommon for areas where non-photogrammetric estimates have been made prior to a systematic photographic census (P. Valkenburg ADF&G, personal communication). The increase is probably a combination of past counting inaccuracy, a better knowledge of herd movements and locations, and increased herd size, similar to that documented for the Western Arctic and Central Arctic Herds.

The entire caribou population of the State of Alaska totals approximately 490,000 animals (P. Valkenburg, ADF&G, personal communication). The TH of approximately 12,000 animals represents about 2% of that total population. Although this herd represents only a small portion of the Alaskan population, it is very important to realize that any impacts on this population would be to a small, discrete group of animals, rather than to a small percentage of the larger, state-wide population. In addition, due to its location, the TH is very important to coastal residents for subsistence uses. This caribou herd is hunted primarily by the residents of Barrow and Nuiqsut, with occasional hunting by the residents of Atqasuk. Until now, there has been no differentiation between the TH and WAH harvest data because of the winter overlap of the two herds. However, there is a high probability that due to the village hunting areas and herd distributions within the region, the TH is of prime importance for the Barrow and Nuiqsut hunters. Subsistence uses within the area will be discussed in greater detail later in this document under the subsistence section.

In order to provide adequate protection from potential impacts, important habitat use areas, such as calving, insect relief and major migration routes, must be identified. Identification of important (traditional) calving areas is difficult because of the continuous movement of caribou throughout their range and the variation in density of calving animals. Not all calving takes place within a delineated calving area each year since there are always scattered groups of cows using outlying areas. Conversely, although small groups of cows can be observed using outlying areas, this does not detract from the fact that traditional areas that have been used for high-density calving year after year can be delineated.

Calving areas for the TLSA have been identified through the 105(c) Land Use Study conducted by the U.S. Department of the Interior, National Petroleum Reserve in Alaska task force during 1977-78, and through additional surveys conducted since 1978. Davis and Valkenburg (1979) reported caribou calving southwest of Teshekpuk Lake during 1976 and 1977, while in 1978 calving occurred northeast of Teshekpuk Lake. Since 1979, calving for the TH has been reported by Reynolds (1982) to have occurred northeast of Teshekpuk Lake. During the 1983 and 1984 surveys conducted by the BLM, caribou aggregates were observed north and east of Teshekpuk Lake. Data gathered during interviews with subsistence users of the region identified the area southwest of Teshekpuk Lake as being used for caribou calving during the 1930s and early 1940s (Bob Gal - field notes 1985). This was approximately the same general area that was used for calving during 1976 and 1977. This historical data and the recent surveys of 1976 and 1977 show that the area southwest of Teshekpuk Lake (Figure 14) has been suitable for calving during different periods of time in the past, and may be used at another time in the future. However, because the most current surveys since 1978 have shown that recent calving is occurring in the area northeast of Teshekpuk Lake, this area (Figure 14) is presently considered the highest-density calving area presently being used by this population. These observations have been limited in scope and additional areas of calving and insect relief within the TLSA could be identified through future inventory and monitoring. These additional areas, if any, may prove to be as important to the existing population as any that have already been

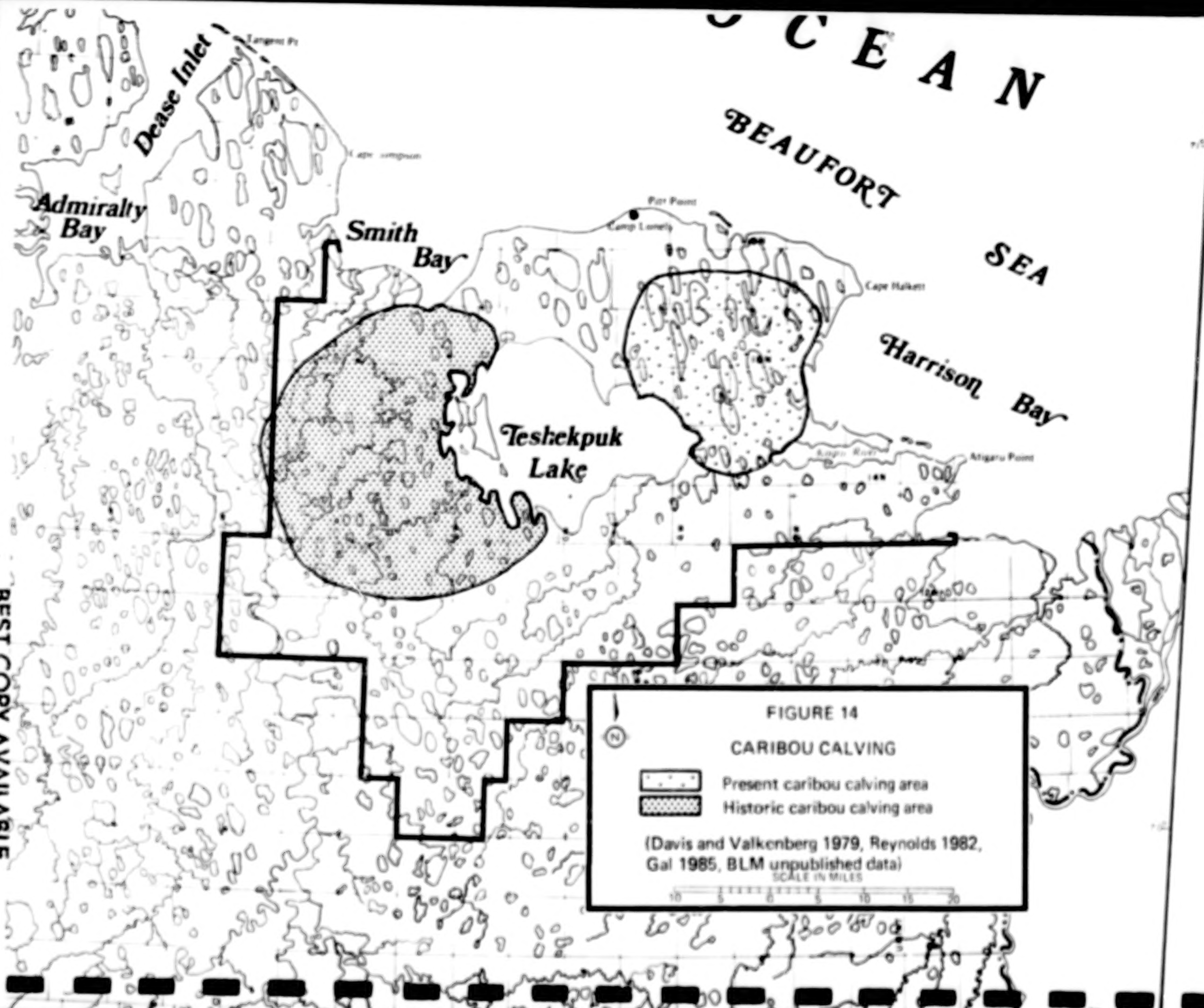


FIGURE 14

CARIBOU CALVING

⁙	Present caribou calving area
▩	Historic caribou calving area

(Davis and Valkenberg 1979, Reynolds 1982, Gal 1985, BLM unpublished data) identified. Expansion of existing or new areas of calving and insect relief could occur as a result of population fluctuations. It is likely that increases in population, with the resultant increased densities of animals, would result in expansion of current areas, with the potential of new areas developing.

The TH remains within the general area year-round. The Teshekpuk caribou, except when in calving aggregates or in insect relief areas, can generally be found in small numbers scattered over most of the TLSA. Radio-collar locations and general observations indicate that the female caribou are generally concentrated north and east of Teshekpuk Lake (Figure 14) during the early spring calving period of May 15 through June 30. From late June through July, the concentrations of caribou have generally been located along the Beaufort Sea coastline from the Ikpikpuk River delta to the Kogru River and around the edges and islands of Teshekpuk Lake (Figure 15). During the fall and winter, from September to April, many of the caribou move out from Teshekpuk Lake in easterly and westerly directions. Accurate winter distributions have not been determined; however, winter observation of collared animals has shown animals ranging as far west as Barrow, but staying mainly around the Dease Inlet area, and ranging as far east as the Fish Creek area. A number of observations have located caribou both north and south of Teshekpuk Lake during the winter months. The caribou within the TLSA do not appear to have clearly defined migration routes like many other herds. However, because of the limited data available, this perception may be from a lack of knowledge and additional surveys may identify migration routes in the future. Presently, the majority of the area north and south of Teshekpuk Lake is used for caribou movements during most seasons of the year.

Distribution of small populations of caribou, such as the Teshekpuk herd, is subject to change depending on the natural cycling of the overall caribou populations in the arctic. The exact relationships between the Teshekpuk, the Central Arctic and the Western Arctic herds are not well-defined at this time. The TH may have been part of a larger herd, (possibly the WAH) and in time it may rejoin a larger herd (Carruthers 1983). Thus, the TH could increase or decrease through natural population dynamics that have nothing to do with industrial development. Systematic surveys and studies must be carried out over a long period of time to develop an understanding of the relationships between the TH, CAH and WAH. In the interim, management philosophy should be to minimize oil and gas-related impacts on the natural processes within the TLSA.

Insect relief areas used by caribou during summer months have been identified (Figure 15). They are generally used from late June through late July as refuges from insect harassment. During July of 1982, the BLM located approximately 750 animals using the Ikpikpuk River delta area and approximately 1,500 animals using the Kealok Creek delta area. During an aerial photographic census in July of 1984, several thousand animals were observed using the shorelines north and south of the Kogru River and the Beaufort Sea coastline from Cape Halkett to Saktunic Point. Data collected during interviews of regional subsistence users depict use of many areas along the Beaufort Sea coastline from the Ikpikpuk River delta to Cape Halkett.

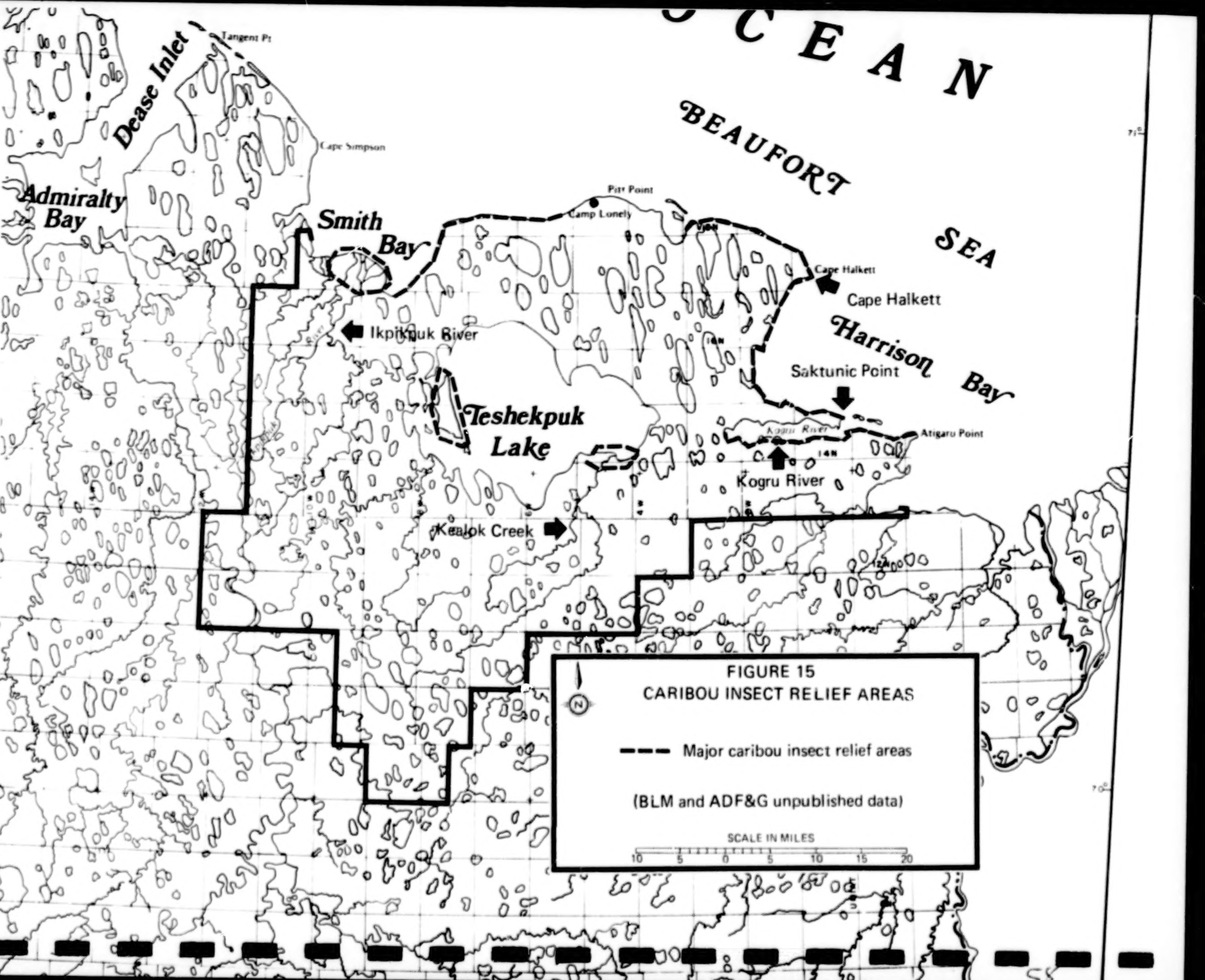


FIGURE 15
CARIBOU INSECT RELIEF AREAS

(BLM and ADF&G unpublished data)

Generally, the areas used for insect relief are sparsely vegetated river deltas, beaches, spits, lake margins and lagoons. It is possible that other insect relief areas within TLSA could be identified through more intensive surveys in the future.

2. Discussion - Sensitivity to Impacts

a. Oil and Gas Exploration Activities

(1) Winter Activities

There has been extensive oil and gas winter exploration within the TLSA since the late 1940s. Exploration activities for oil and gas within TLSA have generally occurred during the winter months when impacts of such activities are minimized. During the winter months caribou are generally dispersed and are less susceptible to noise and visual disturbances.

(a) Cross-country Transportation

Winter geophysical operations and cross-country transportation of drilling equipment and supplies have been conducted within TLSA for several decades. There have been 3,000+ miles of seismic profiles (both dynamite and vibroseis) recorded within the area since 1949. These operations are felt to have had no significant impacts on caribou because they were conducted with specific protective stipulations and during periods of time when caribou appear to be less susceptible to disturbance. During the winter period caribou disperse out over a much larger area and are in smaller groups than during the spring and summer months. One of the conclusions from the Caribou/Waterbird workshop conducted by the BLM in May of 1982 was that winter seismic operations do not appear to have had significant impacts on caribou to date (Gilliam and Lent 1982).

It is not anticipated that future geophysical and cross-country activities would have any significant impacts on caribou if they are conducted during the winter months, strictly controlled to ensure protection of the wildlife resources present, and are closely monitored.

(b) Exploratory Drilling

There have been eight oil and gas wells drilled within the area, seven during the winter and one during the summer.

As was discussed earlier under the waterbird section, exploratory drilling can generally be conducted with minimal surface disturbance if ice pads are used rather than gravel pads. In addition, the use of ice pads, roads and ice airstrips alleviates the potential of access into the area after the drilling phases are finished.

Winter exploratory drilling does have an effect on the animals immediately adjacent to the drilling operation, but because the area of disturbance is generally small most animals will move around the disturbance and will not be significantly effected. During the winter months the animals are not concentrated into large groups, as during the spring and summer, but are generally scattered out over a large area.

The potential for contamination of the environment by hazardous substances from a drilling operation does exist. Drilling operations have a variety of substances, such as oil, various fuels, drilling muds and other liquid and solid wastes. However, the potential of any contamination can be reduced by requiring strict safeguards during any drilling operation. These safeguards include adequately sized reserve pits, proper fuel storage and handling and backhauling or reinjecting hazardous fluids.

Gilliam and Lent (1982) concluded that winter exploratory drilling operations and activities would have little or no significant impacts on caribou if undertaken with similar protections as are being used for geophysical and cross-country operations.

(2) Summer Activities

Caribou appear to be generally more susceptible to disturbance during the spring and summer months, consequently any activities occurring within this time frame are more likely to cause significant impacts than at other times of the year.

Because development activities generally require more ground-level as well as aircraft-related operations than exploration activities, impacts associated with summer activities, aircraft disturbance, habitat alteration and contamination will be discussed in more detail in the oil and gas development activities section.

b. Oil and Gas Development Activities

(1) Alteration of Habitats

Impacts associated with exploration activities for oil and gas are generally acceptable when appropriate seasonal and locational stipulations are applied to areas of crucial caribou use. However, activities associated with the development of producing fields cannot always be avoided.

Activities associated with development are generally more permanent (20 years or more) in nature than those of exploration activities (0.5 to 2 years). Development of oil and gas fields requires a network of well pads, roads and pipelines to tie the producing wells together and to allow for removal of the petroleum products to a collection point. Impacts such as roads, pipelines, well pads, airstrips, housing facilities, etc., could alter the natural drainage of the area and potentially cause a direct loss or modification of habitats by flooding or dewatering areas.

From general observations, female caribou within the Teshekpuk Lake area appear to be selecting upland habitat sites for calving, possibly because these sites are the driest available. This also appears to be the case in the Central Arctic Caribou Herd, where Lawhead and Curatolo (1984) found that upland tussock tundra areas were being selected by female caribou during the calving season. These drier areas are sometimes only a few feet above the moist and wet tundra which dominates the area. If these normally drier sites become unusable through flooding or facility placement, caribou calving could be displaced. During development activities a continuous review of activities and population dynamics could help to reduce any impacts.

Direct physical loss and/or modification of existing habitats through changed drainage patterns during oil and gas development would generally be small in comparison to the overall area available. However, the loss or alteration of small areas could potentially have significant impacts on caribou, if the small areas altered support a large concentration of animals and/or are used during crucial life-function time periods. The proper engineering of roads and pads could help alleviate this type of potential impact, although current development practices on the North Slope have not been entirely successful in maintaining the natural hydrology of wetland areas. Although there is a loss of certain types of habitat when pads, roads, or airstrips are built, these structures do provide some insect relief habitat for caribou during the summer months.

(2) Disturbance

(a) Construction/Facility Activities

Pipelines, roads and associated human activities can have direct impacts on caribou calving, behavior, migration and distribution. Studies have shown that pipeline and/or road complexes, with associated human activities, have resulted in different degrees of impacts on caribou (Curatolo et al. 1982).

The biology of caribou and comparable ungulate species strongly suggests that caribou react more strongly to disturbance during calving and post-calving periods than at other times of the year. Oil and gas activities during and immediately after calving are likely to have the most significant impacts on population demographics (Gilliam and Lent 1982). Cameron (1983) suggested that pregnant cows and cows with calves react strongly to disturbances and will move to areas of less activity. In the worst case, oilfield development could result in caribou being displaced from previously occupied calving areas (Cameron 1983).

The calving and post-calving periods, May 15 through June 30, appear to be the most sensitive time for pregnant females and females with young. Klein (1979) concluded that female caribou with young show a much stronger avoidance of obstructions during the spring and summer than during other times of the year. Male caribou seem to be more adaptable to man-made features, accepting them more readily than females with young. Cameron et al. (1979) concluded that cows and calves appear to be more sensitive, more easily alarmed and more likely to flee from a potential threat than male caribou. Whitten and Cameron (1983) concluded that female caribou avoid areas of petroleum-related activity, while bulls appear to be less sensitive.

Pipelines, roads and associated human activities may also disrupt migration patterns and overall distribution of a caribou herd. Hanson (1981) found that caribou readily crossed berms where the height was less than 1.2 meters, while encounters of berm heights of greater than 1.2 meters generally invoked a greater avoidance response. Klein (1979) concluded that roads and pipelines

BEST COPY AVAILABLE

in open terrain could be more of a disturbance to caribou than roads and pipelines in forested areas. Caribou appear to be less disturbed by elevated pipelines in forested areas than in open tundra. Curatolo et al. (1982) found that little if any response was detected when caribou were crossing roads if no traffic was present. However, almost half the caribou had a severe reaction when traffic was encountered. A "severe reaction" in this study was characterized by animals running or galloping away from the disturbance or obstacle. In areas where the road and pipeline were parallel with each other, the caribou tended to panic when they were between the two obstacles if traffic was present. Curatolo et al. (1982) recommended that roads paralleling pipelines be constructed at least 1/2 mile from the pipeline. Klein (1979) found that caribou generally showed greater avoidance of traffic and other human activities than of physical features, such as roads, railroads, etc. In addition, Klein (1979) concluded that caribou populations that are unhunted by man and large predators, such as wolves and bears, become habituated to obstructions and disturbances more readily than those populations that are hunted. However, Lawhead (1984) found that caribou would cross roads within an oil field complex without major problems. Between July 1 and July 31, approximately 50% (9,000 animals) of the caribou being observed did successfully cross the Oliktok Point Road (Lawhead 1984). Murphy (1984) found that caribou would use crossing ramps if the ramps were in optimal locations. During the study vehicles were the most common source of disturbance, and a significant difference in disturbance was observed between animals using crossing ramps and those that did not. Over 50% of the animals crossing at locations without ramps had a moderate to severe reaction, while only 10% of those crossing ramps had a moderate to severe reaction (Murphy 1984). In this report a moderate reaction was categorized as a movement at a walk and a severe reaction was a movement at a trot or run from the disturbance (Murphy 1984). Woodward-Clyde Consultants (1983) found that a few caribou (approximately 20 bulls) do reside within the Lisburne Development field, with an additional several hundred residing in the nearby Sagavanirktok Delta. Because of its coastal location, the Lisburne Field did have one large group of caribou (1,000+) during 1983 enter the field to avail themselves of the mosquito relief habitat along the coast. These larger groups of animals generally occur during late June through July when mosquito harassment is at its worst and insect relief habitat along the coast is utilized. During this study the caribou were able to move through the area, although some groups of animals did experience some problems crossing roads during heavy traffic periods, and some crossing attempts failed (Woodward-Clyde Consultants 1983).

Disturbance of caribou behavior relative to development impacts has not been quantified, but many observations have been documented and discussed subjectively. Generally, a behavioral change that results in a demographic change will take time to manifest itself in a caribou herd. Carruthers et al. (1984) concluded that the Trans-Alaska Pipeline has had no significant impact on the Central Arctic caribou herd. However, Carruthers et al. (1984) did find a significant difference in caribou behavior between areas along the pipeline and control areas away from the pipeline. The study found that caribou were feeding less along the pipeline than in areas away from the pipeline. During August 1981-83 caribou moved away from Dalton Highway areas used by bow hunters. Caribou build up their energy reserves for winter over a short period of time from June to August. Animals affected by impacts of pipelines or road developments during this crucial time period may have a lower survival rate due to lower energy reserves when entering the winter period. These disturbances could cause major impacts if they occur within important habitat areas.

Roads and airstrips provide access which can increase sport and subsistence hunting, but they can also account for animal fatalities due to collision with vehicles. Permanent roads and airstrips that would be needed for a developed oil and gas field could change the overall distribution of hunting within an area. Hunters tend to adapt very readily to increased access into areas. An example of this is Umiat, located along the Colville River, which was originally established to support oil and gas-related activities in the late 1940s. The Umiat airstrip is now being used by many moose and caribou hunters as a major access point. In 1984, the well-developed airstrip allowed a group of hunters to use a DC-4 to provide fuel for smaller aircraft and to transport meat (J. Trent ADF&G, personal communication).

Roads can potentially have a greater effect on the distribution of hunting within an area than airstrips. Roads allow easier and cheaper year-round access by trucks, snowmachines and all-terrain vehicles. Wildlife in areas that are bisected by roads can be exposed to almost continual, year-round hunting pressure. The Barrow gas field road, which runs about 12 miles south of Barrow, is an example of a road that allows year-round hunting access by motorized vehicles (J. Trent ADF&G, personal communication).

Hunting within an oil and gas development complex can generally be controlled by establishing specific restrictions within the area, although these restrictions may then adversely affect subsistence users.

Noise (excluding vehicular traffic and aircraft noises) from stationary sources does not seem to have any significant impact on caribou. Klein (1979) concluded that caribou readily adapt to sounds associated with nonvisible sources and fixed objects, such as compressor stations, drill rigs, etc.

(b) Aircraft

A primary concern regarding oil development is the effect of aircraft on caribou, especially during the calving season. Caribou, disturbed by aircraft, react directly with flight behavior and physiologically with increased heart rate. The escape response, which may produce injury, is most easily observed; but there is no documentation on injuries. These would occur infrequently, and only if the overflights were extremely low and numerous. The long-term physiological effects are very difficult to quantify and document. They are subtle in nature and require many disturbances before becoming recognizable.

Strong wildlife reactions to aircraft were noted by a number of researchers when aircraft were operating at low altitudes. Calef et al. (1976) and Davis and Valkenburg (1979) used a disturbance-response class (Table 5) to determine the degree to which caribou react to aircraft.

TABLE 5*

Caribou Response to Aircraft

Class 1. Panic response. Animals were completely out of control; they stumbled, collided with one another, and ran into obstacles such as willow patches or trees. There was some subjectivity in distinguishing this class from the following one.

Class 2. Strong escape response. Animals trotted or ran, and usually continued running after the aircraft had passed.

Class 3. Mild escape response. Animals moved away from the aircraft or from the original direction of movement in the case of traveling animals. This class included only animals which walked or trotted a short distance.

Class 4. Stationary response. Animals stopped feeding, rose from resting position, or assumed alarm posture.

Class 5. No visible response. Animals continued feeding or resting or, if moving, continued at the same pace in the same direction.

* Davis and Valkenburg (1979).

Davis and Valkenburg (1979) concluded that there was a direct relationship between the altitudinal and horizontal distance that small fixed-wing aircraft passed and the strength of animal response. They found that aircraft passing within 50 meters (m) (165 ft.) invoked a mild escape response (class 3) in over 70% of the groups observed. All of the groups observed had at least some visual response (class 4). However, when aircraft passed between 80-160m (260-525 ft.) only about 15% of the groups exhibited a class 3 response and over 40% showed no visual response (class 5). They did not find any clear-cut differences attributed to group size and their reaction to aircraft. However, larger groups were more likely to react strongly. In addition, they concluded that during most of the year, light fixed-wing aircraft operating above 300m (985 ft.) altitude would not cause caribou to injure or exhaust themselves. They also concluded that extra protection should be afforded during the calving season from May 15 to June 30 by increasing the minimum altitude to 600m (1,967 ft.).

Calef et al. (1976) concluded that caribou have different responses during different seasons of the year. He found that aircraft operating at heights above 160m (525 ft.) during the spring and fall elicited no panic (class 1) or strong (class 2) responses; it was concluded that this height prevented most observable impacts to caribou.

McCourt et al. (1974) found that caribou reacted more strongly to helicopters (Bell 206) than to fixed-wing aircraft (Cessna 185) at low altitudes of less than 90m (300 ft.). However, at altitudes greater than 90m no difference in reactivity was determined. This difference in reactions at lower altitudes may be explained by the difference in noise levels of different types of aircraft. There is considerable difference in the sounds produced by different types of aircraft, particularly between fixed-wing and rotary-wing aircraft. They found that the reactions of caribou to aircraft disturbances decrease as the altitude of the aircraft increases, up to an altitude of approximately 300m (985 ft.). Reactions to aircraft above 300m were infrequent. They concluded that, taking all of the threshold levels of responses into consideration, an altitude of 300m should be used as minimum altitude.

Miller and Gunn (1979) found that at least some percentage of all caribou groups observed reacted to helicopter over-flights at less than 400m (1,310 ft.). They concluded that cow-calf pairs were the most responsive to disturbance while bulls were the least responsive of the sex/age group types observed. In addition, larger groups of animals (more than 20) tended to be more responsive than individuals in smaller groups. they suggested that the minimum altitude for aircraft during calving and post-calving should be greater than 600m (1,967 ft.), and during the winter should be greater than 300 m (985 ft.).

Shepard et al. (1982) concluded, through meetings with industry, that modifications to normal operations to help reduce aircraft disturbance would be feasible (Appendix II).

(3) Contamination

Environmental contamination could occur during oil and gas exploration and development activities such as fuel spills, drilling mud additives, solid waste disposal, etc. Operators are required to develop and implement spill and contamination prevention plans. There are many stipulations and requirements established by the BLM (Appendix II), the Federal Environmental Protection Administration, the State of Alaska and the North Slope Borough; all aimed at preventing undue contamination of the environment. In-place stipulations and adequate monitoring should alleviate contamination of the environment that would significantly affect Teshekpuk area wildlife and their habitat.

4. Caribou Protective Measures

If an area is leased for oil and gas the company has the right to develop that discovery with reasonable environmental protections applied. Winter exploration activities, properly designed and monitored, have not had any significant effect on caribou to date. However, year-round activities necessary within a developed complex, such as roads, pipelines, well pads, airstrips, living quarters, etc., could have impacts if they occur within important or crucial habitat areas. Additional analysis of specific development designs, along with herd behavioral data, will be necessary in a development environmental impact statement to provide adequate protection of caribou.

The TLSA can be divided into three areas based on caribou values and their sensitivity to oil and gas-related activities. Based on the available literature, as discussed in this chapter, pregnant cows and cows with calves would not be compatible with a major oil and gas development complex. The following measures will provide protection for caribou from both exploration and potential future development activities within the Teshekpuk Lake Special Area.

Area 1 - Present Caribou Calving Area (Figure 14) (Appendix VI, Map 3).

Protective Measures

- All ground level activity would be restricted to July 1 thru May 14 except for authorized scientific studies.

- Do not allow habitat alterations and disturbances, including but not limited to dredging, filling and excavating. (Note: winter geophysical exploration, with appropriate stipulations and adequate snow cover, will not be considered surface-disturbing).

- No permanent facilities, including but not limited to roads, pads, camps, airstrips, compressor stations and pipelines, would be allowed.

- Require aircraft to avoid flying over the area or to maintain an altitude of 2,000 ft. AGL from May 15 to June 30. Flight corridors may have to be established to eliminate impacts to caribou.

- Require aircraft to maintain an altitude of 1,000 ft. AGL from July 1 to May 15 (except for take off and landings).

Area 2 - Caribou Insect Relief Areas (Figure 15) (Appendix VI, Map 3).

Protective Measures

- All ground level activity would be restricted to August 1 thru June 30.

- Do no allow habitat alterations and disturbances, including but not limited to dredging, filling and excavating. (Note: winter geophysical exploration, with appropriate stipulations and adequate snow cover, will not be considered surface-disturbing).

- No permanent facilities (except Camp Lonely), including but not limited to roads, pads, camps, airstrips, compressor stations and pipelines, would be allowed.

- Require aircraft to maintain an altitude of 1,000 ft. AGL from August 1 to June 30 and 2,000 ft. AGL from July 1 to July 31 over areas designated as insect relief (Figure 15). Flight corridors may have to be established to eliminate impacts to caribou.

Area 3 - Caribou General Habitat Areas (remainder of TLSA not included in either the calving or the insect relief areas) (Appendix VI, Map 3).

Protective Measures

- A Surface Development Plan would be prepared as part of an EIS, which would allow the orderly development of oil and gas by designing reasonable estimates of the development needs throughout the life of the field, and insure caribou passage to and from important use areas. A development plan is important for the TLSA because of the wildlife concentrations, and the relatively restricted range.

- Roads, pads and facilities would be constructed between September 1 and April 30 when feasible. Routine maintenance, production and transportation would be allowed year-round.

- Permit only temporary roads or facilities during the exploratory phase.

- The natural drainage patterns would be identified prior to, and maintained during, construction of roads, pads, pipelines and other facilities. Culverts, bridges and other such drainage structures would be installed where needed to maintain natural drainage patterns. Where natural drainage patterns have been altered by facility placement, retrofitting within one season to correct drainage problems would be required.

- Require aircraft to maintain an altitude of 1,000 ft. AGL year-round (except for take off and landings).

Based on the available literature, it appears that caribou respond differently to different impacts, depending on sex and age. It appears that pregnant cows and cows with young are the most sensitive to overall disturbances. Bulls appear to be the least sensitive. In addition, caribou appear to be more sensitive to disturbances during the spring and summer months (May - July) than during winter months. Based on the information on the potential impacts from oil and gas development activities presented in the discussion section, the preceding protective measures are necessary, pursuant to cooperative intent of the BLM to maintain protection and continuation of the Teshekpuk Lake Caribou Herd.

V. SUBSISTENCE VALUES

A. Introduction

Archaeological remains testify to human occupation and/or use of the area surrounding Teshekpuk Lake for several thousand years (Davis et al. 1981). Burch (1980) has reconstructed the territories of the early 19th century Inupiat (North Alaskan Eskimo) societies. Two of Burch's societies, the Arctic Coastal Plain Society and the Colville River Society may have utilized the area, although Teshekpuk Lake and the areas north and east of the lake are not included in the territories of either society as delineated by Burch (1980). Yet, in the early summer of 1894, Charles Brower (1942) camped at the eastern end of Teshekpuk Lake and was prompted to remark, "With caribou all about us and fish so numerous that sometimes we could catch a week's supply in a single hour, it was a great life."

Concentrated, year-round occupation of the Teshekpuk Lake area is not adequately documented prior to its use by reindeer herders from shortly after their introduction to the Barrow area in 1898 (Stern et al. 1980) until the 1940s.

Within the memory of many living informants, four winter villages with sod houses were occupied within the Teshekpuk Lake Special Area (Figure 16). Figure 17 indicates the location of other features of settlements which suggest protracted or concentrated occupation. Isuk (Esook on USGS maps), also known as Halkett, was located just west of Cape Halkett and was occupied by families tending one of the U.S Reindeer Service's herds (Cape Halkett herd). Qalluvik (Kolovik on USGS maps) was founded by William Leavitt, Sr. who served as chief herder for a Brower reindeer herd kept near Teshekpuk Lake. The Leavitt's first winter house, now gone, was used only briefly before a new house was built at the site of Qalluvik. This second location was attractive because of its slight elevation and sandy soils and other herders built their winter houses and ice cellars there. When Rev. Klerekoper traveled from Barrow to Demarcation Point by dogsled in 1937, he made no mention of people living at Qalluvik, but photographed George Leavitt, Jr.'s family at Kokruagaruk at Pitt Point, a few miles east of Qalluvik (North Slope

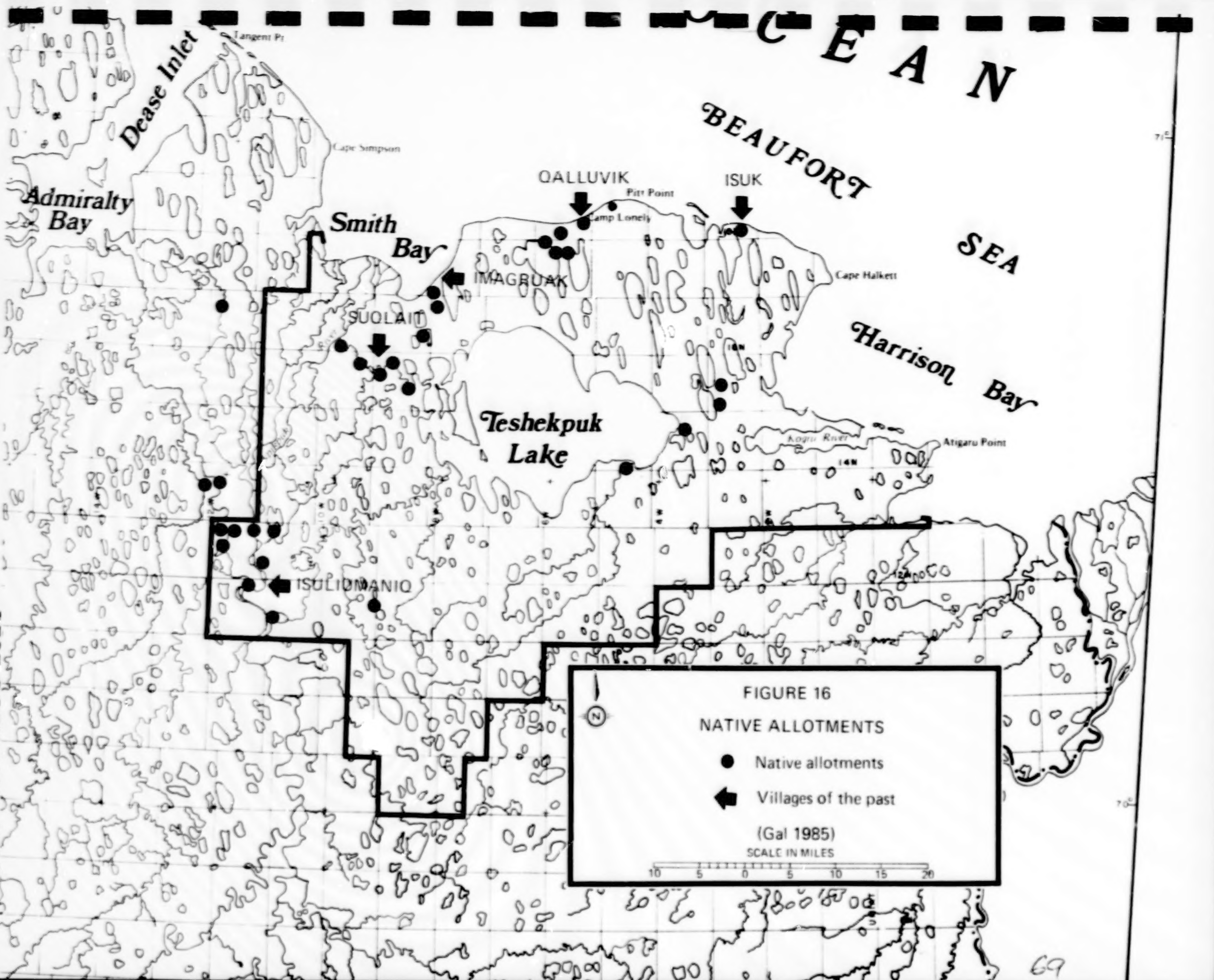


FIGURE 16

NATIVE ALLOTMENTS

● Native allotments

⬅ Villages of the past

(Gal 1985)

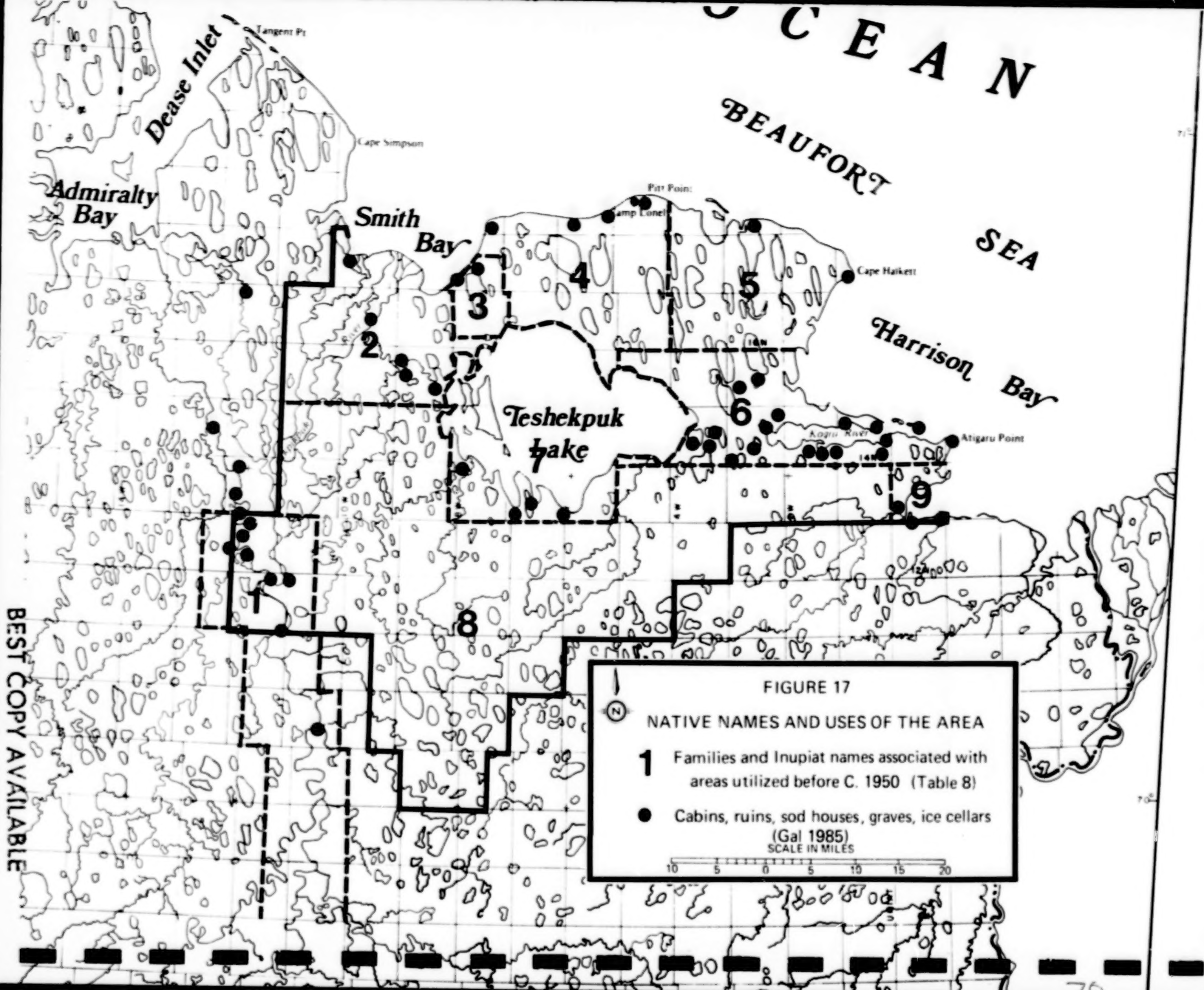


FIGURE 17

NATIVE NAMES AND USES OF THE AREA

Borough 1977). He also photographed 29 of the residents of Cape Halkett (Isuk). The village of Imagruaq was also presumably occupied by herders and their families but detailed information was not obtained for this community. At least four winter houses once existed at Imagruaq; however, the eroding eastern shore of Smith Bay has demolished all traces of the settlement. An old man, Amaguaq, and his wife lived here; he was suspected of being an angakuk (shaman). He died of starvation together with his wife after refusing to join the last emigrants to Barrow in the 1940s (Arundale and Schneider 1983). The village of Isuliumaniq on the Ikpikpuk River was a desirable location because of good fishing in a nearby deep channel of the river. Isuliumaniq was last occupied in the 1940s. Burch (personal communication) has redefined his Arctic Coastal Plain Society (Burch 1980) and now identifies the Ikpikpugmiut, "the people of the Ikpikpuk River," as a distinct society. Isuliumaniq was not a village founded or used by herders and may be one of the last settlements of Ikpikpugmiut; two house pit depressions and a cache pit were sited at the location noted by informants as Isuliumaniq (Gal 1985). An archaeological site not far from Isuliumaniq consists of three deep house pit depressions with deep entrance passages and five cache pit depressions and probably relates to 19th century Ikpikpugmiut occupation of this western-most portion of the Teshekpuk Lake Special Area.

Although the Teshekpuk Lake Special Area is occupied seasonally and often for long periods of time, no year-round occupation takes place today. Individuals who once lived in the Teshekpuk Lake Special Area, and in some cases their children, are Inupiat elders today whose stories and experiences will likely shape future subsistence use of the area, just as they shape current subsistence use of the area.

B. Sources of Data

1. Data Needs

A general objective for the subsistence portion of the Teshekpuk Lake Special Area Study was to provide geographic and systemic discernment of human activity in relation to the environment. Three specific questions were posed to focus data collection:

- Do the residents of Barrow, Nuiqsut and Atqasuk depend on biological or other resources of the Teshekpuk Lake Special Area for their daily welfare? What are the priority subsistence uses of the Teshekpuk Lake Special Area?

- If they do, when, where and how do people make use of these resources for food and the necessities of life?

- Has a cash and subsistence economy affected more traditional yearly activity cycles and placed food gathering within the Teshekpuk region subordinate to a less mobile life based upon purchased items?

2. Available Literature

A review of the available literature revealed no sources which identified high priority subsistence use areas or provided a practical methodology for the geographic delineation of areas based upon subsistence values. Most of the studies were found to be too unfocused, lacking in detail, or generally irrelevant, such as U.S. Department of the Interior 1978a, 1979; Hoffman et al. 1978; Schneider et al. 1980; Galginaitis et al. 1984.

The most useful details concerning subsistence practices and harvest locations were found in the Traditional Land Use Inventories (TLUI) (Hopson 1976, 1977) which were produced under the auspices of the North Slope Borough's Planning Department. The two Traditional Land Use Inventories which pertain to the Teshekpuk Lake Special Area (the Barrow/Atqasuk TLUI and the Nuiqsut/Tasikpak TLUI) were especially useful as they benefited from a consistent, area-wide collection methodology and were prepared by a researcher/compiler fully conversant in both Inupiaq and English. An unpublished manuscript by Arundale and Schneider (1983) reporting on the Chipp-Ikpikpuk Oral History Project provided much useful site-specific information on the western half of the Teshekpuk Lake Special Area; their section "Historical Overview", particularly the chapter entitled "The Transitional Past 1910-1946," provided a useful outline to which the Teshekpuk data were fitted.

It was determined that the subsistence land use maps for the Teshekpuk and Harrison Bay quadrangles were not very useful Pedersen 1979, Arctic Environmental Information and Data Center 1979). All of the subsistence land use maps were found to be temporally unconstrained composites of maximum extent of use according to a particular land use category. These composites were based upon an unspecified number of individual use maps (their representativeness is therefore suspect). Such maps are not, except after a general fashion, useful for evaluating impacts. As such maps essentially depict undifferentiated land use across vast areas, significant adverse impacts to subsistence values can only be measured (or mitigated) in terms of the percentage of the area committed to incompatible uses beyond a critical threshold. In the absence of models or methodologies for estimating these thresholds, the existing land use maps constitute only curious historical descriptions.

The literature review thus indicated that the geographic delineation of subsistence values for the Teshekpuk Lake Special Area would require the development of a new approach as well as the systematic collection of new data. The review also disclosed that the village of Nuiqsut had endured no fewer than 14 separate social scientists in the recent past. Contacts with the Alaska Department of Fish and Game revealed that Sverre Pedersen of the Subsistence Division planned to collect land use data from individuals at Nuiqsut during the winter of 1984-85. Therefore, limiting additional intrusions at Nuiqsut was established as a BLM goal. Early contacts were made with Pedersen of the ADF&G Subsistence Division and with other researchers known to have worked recently in the area to acquire unpublished data and so avoid redundant interviews. Pedersen (who had fieldwork scheduled for Nuiqsut in early 1985) agreed to structure his interviewing to meet the informational needs of both the Subsistence Division and the Bureau of Land Management. Pedersen also provided bibliographic references for the Teshekpuk Lake Special Area. Edwin S. Hall, Jr., who recently collected subsistence information at Anaktuvuk Pass was contacted to obtain any data regarding Anaktuvuk residents' usage of the Teshekpuk area in conjunction with visits to the trade fair at Niglik on the Colville River delta. Grant Spearman, who had worked with both Anaktuvuk Pass and Nuiqsut residents, was also contacted.

The mayor of the North Slope Borough pledged the support of his office and both the Commission on History, Language and Culture and the Environmental Protection Office provided support. James Nageak of the NSB Inupiat Office agreed with Arundale and Schneider to make available the unpublished manuscript on the Chipp-Ikpikpuk. Many hours of research time were saved by access to the Inupiat Office's file copy of MacLean's (1971) "Genealogical Record of Barrow Eskimo Families."

3. New Data

New data specific to the Teshekpuk Lake Special Area Study were obtained through public meetings and through individual interviews. Two basic forms of public meetings were used: an explanatory presentation and an explanatory presentation followed by a workshop.

The owners of Native allotments were targeted as a primary population of potential subsistence users of the Teshekpuk Lake Special Area for a number of reasons. Table 6 identifies the individuals who volunteered information. practicality was a consideration. BLM had recently completed field examinations of all Native allotments within the Arctic Resource Area. Summaries and lists of Native allotments were computerized, enabling these data to be handily assembled. Surprisingly, of the 26 persons owning a Native allotment within the Teshekpuk Lake Special Area, 25 resided in Barrow; a single allotment owner resided in Nuiqsut.

The population of Native allotment owners was targeted for administrative and anthropological reasons as well. Burch (1981) has identified "three factors which combined to impose practical limitations on freedom of settlement, hence of land use." He pointed out: 1) While individuals and families did not own hunting and fishing territories, they did own sod houses. Stationary houses therefore tended to be located at the best site and were occupied year after year. 2) Repeated hunting forays from the same settlement fostered accumulation of detailed environmental knowledge. Having such detailed knowledge bestowed an advantage to a hunter within his own catchment area (Higgs and Vita-Finzi 1972, Burch 1981) and discouraged hunting forays to other districts. 3) The social world was organized along extended family lines and relocation therefore meant abandoning one's family, a potentially dangerous and fearful action.

According to the allotment examiners' field reports, 52% of the allotment parcels within the Teshekpuk Lake Special Area contained a habitable dwelling and/or some historic structure; 9 parcels, or 33%, contained a habitable structure. Accepting Burch's argument regarding the limitations on an Inupiat's freedom of settlement, it was assumed that allotment owners as a

TABLE 6

Persons Interviewed at Workshops in Barrow, Atqasuk and Nuiqsut, Alaska

Date (1985)	Name	Allotment	Context/Location
Jan. 8	Thomas Brower, Jr.	N	group/Atqasuk
Jan. 8	Walter Akpik, Sr.	N	group/Atqasuk
Jan. 8	Thomas Itta	N	group/Atqasuk
Jan. 8	James Aiken	N	group/Atqasuk
Jan. 14	Arnold Brower, Sr.	Y	individual/Barrow
Jan. 16	Charlie Edwardsen, Sr.	N	family/Barrow
Jan. 16	Mary Edwardsen	Y	family/Barrow
Jan. 17	Arnold Brower, Jr.	N	individual/Barrow
Jan. 17	Ron Brower	N	individual/Barrow
Jan. 18	Warren Matumeak	N	individual/Barrow
Jan. 18	Lillian Nageak	Y	individual/Barrow
Jan. 19	Brenda Itta	Y	family/Barrow
Jan. 19	Edward Itta	Y	family/Barrow
Jan. 19	Noah Itta	Y	family/Barrow
Jan. 19	Mary Itta	Y	family/Barrow
Jan. 19	Dorcas Ballot	Y	family/Barrow
Jan. 20	Eugene Brower	N	individual/Barrow
Jan. 21	Wesley Aiken	N	individual/Barrow
Jan. 21	Daniel Leavitt	N	individual/Barrow
Jan. 21	Frieda Elavgak	Y	family/Barrow
Jan. 21	John Elavgak	N	family/Barrow
Jan. 21	Joseph Elavgak	Y	family/Barrow
Jan. 21	Martha Matumeak	Y	family/Barrow
Jan. 21	Warren Matumeak	N	family/Barrow
Jan. 21	Lillian Nageak	Y	family/Barrow
Jan. 21	Marchie Nageak	Y	individual/Barrow
Jan. 22	George Leavitt	N	individual/Barrow
Jan. 22	Joseph Panigeo, Jr.	Y	individual/Barrow
Jan. 22	Wyman Panigeo	Y	individual/Barrow
Jan. 22	Thomas P. Brower, Sr.	N	individual/Barrow
Jan. 23	Adam Leavitt	N	individual/Barrow
Jan. 23	Sally Brower	Y	individual/Barrow
Jan. 24	Harry Kaleak	Y	individual/Barrow
Jan. 24	Charles Sakeagak	Y	family/Barrow
Jan. 24	Gerald Sakeagak	Y	family/Barrow
Jan. 24	Kenneth Brower	Y	individual/Barrow
Jan. 26	Joe Ericklook	Y	group/Nuiqsut
Jan. 26	Sarah Kunaknana	N	group/Nuiqsut
Jan. 26	Nelson Ahvikhanna	N	group/Nuiqsut
Mar. 14	Kenneth Toovak, Sr.	N	group/Barrow

group (especially those with habitable dwellings on their allotment) were probably better able to articulate a detailed knowledge of catchment and scanning zones (Burch 1981) within the Teshekpuk Lake Special Area than any other group of subsistence users. Allotments, like housesites, were assumed to have been selected because they were considered "best sites" for access to one or more subsistence resource. According to this reasoning, the population of allotment owners was an ideal study population for the geographic discrimination of subsistence values. Allotment owners were also a potential source of historic data. If allotment owners had social or historic ties to the archaeological remains (sod houses, ice cellars, etc.) on their allotments, their knowledge might well provide insight into short and long temporal cycles in subsistence resource availability and use.

From an administrative standpoint, interviews with allotment owners were desirable. Native allotments are small blocks of private inholdings in public domain lands. Allotments are utilized as subsistence harvest locations or, more often, as basecamps from which subsistence resources are sought. Data regarding the use of the allotments and the public lands immediately surrounding them would be useful to the BLM in its land use planning and consideration of requests for use authorizations.

Eleven days were spent at Barrow interviewing Native allotment owners. The objective of interviewing all 27 Native allotment owners was not realized. Six allotment owners were not interviewed (Table 7). Twelve interviews of persons who did not have a Native allotment were completed at Barrow. These individuals were selected for an interview because they had been identified in the literature and/or by other persons interviewed as being knowledgeable about the area. This network approach identified many more potential informants than could be interviewed in the available time; the names of families and individuals associated with various sub-areas within the Teshekpuk Lake Special Area are listed in Table 8. Over twenty hours of individual interviews were taped at Barrow.

C. Subsistence Resources of the Teshekpuk Lake Special Area

The land use maps used by the North Slope Borough in its "Comprehensive Plan" indicate use of the Teshekpuk Lake Special Area by one or more individuals from the villages of Barrow, Atqasuk and Nuiqsut. Testimony at the public meetings and workshops, however, indicates that the Teshekpuk Lake Special Area is used predominantly by persons from Barrow and most of this use occurs from spring until after freeze-up in the fall. However, subsistence users can be expected to be found in the Teshekpuk Lake Special Area at any time of year; no users reside in the area year-round.

At one time or another, the full range of subsistence resources have been harvested from the Teshekpuk Lake region. Fish and caribou are the primary subsistence resources used today while waterfowl hunting plays a secondary role. Trapping seems to have decreased in the area since the mid-1970s. If given a choice of foods, it is suspected that most Inupiat would choose caribou over fish, though fish is a more dependable staple. In response to the question, "How often do you eat fish?" one family responded, "It depends on what else we have to eat."

TABLE 7

Association of Allotment Owners with Teshekpuk Lake Special Area

IND No.	INT	Born in Area	Child in Area	MoFa Used Area	Mat Ties	Pat Ties	Other Ties	No. Adult Child	
1	Y	N	N	Y	Y	Y	?	0	
2	Y	N	Y	Y	Y	Y	?	?	
3	Y	N	N	Y	?	?	S	?	
4	D	N	Y	Y	?	Y	S	?	
5	Y	N	Y	Y	?	N	?	17	
6	Y	Y	Y	Y	?	?	?	?	
7	Y	N	Y?	Y	?	?	S	12	
8	Y	?	?	?	?	?	A	8	
9	N	Y	Y	Y	?	?	?	?	
10	Y	N	Y	Y	?	?	?	4	
11	Y	?	?	?	?	?	A	?	
12	Y	N	N	Y	Y	Y	?	0	
13	Y	Y	Y	Y	?	?	S	10	
14	Y	N	N	Y	Y	Y	?	?	
15	Y	Y	Y	Y	?	?	?	0	
16	Y	N	N	N	N	N	H	0	
17	N	N	N	Y	Y	Y	?	?	
18	N	Y	Y	Y	?	?	S	2	
19	N	Y	Y	Y	?	N	S	2	
20	Y	Y	Y	Y	?	?	?	1	
21	Y	N	N	N	N	N	S	?	
22	Y	N	N	N	?	?	?	?	
23	Y	N	N	Y	Y	Y	?	?	
24	N	?	N	Y	Y	N	?	?	
25	Y	Y	Y	Y	?	?	S	8	
26	Y	N	N	Y	Y	Y	?	?	
	26	23	24	24	10	13	11		No. responses
	20	8	13	21	8	8	8,2,1		No. positive
	77%	35%	54%	88%	80%	62%	73,18,9%		% positive

IND No. = Number Code to Persons Interviewed

INT = Interview Status (Yes, No, Deceased)

Born in Area = Was the person born in the area? (Yes, No)

Child in Area = Did the person spend part of his/her childhood in the area (Yes, No)

MoFa Used Area = Did the person's parents once reside in the area as a household? (Yes, No)

Mat Ties = Did the person's maternal grandparents once reside in the area as a household? (Yes, No)

Pat Ties = Did the person's paternal grandparents once reside in the area as a household? (Yes, No)

Other Ties: S = spouse and/or spouse's family utilized area
A = became familiar with area as a young adult, exact ties not known.
H = became familiar with the area through a hunting partner and/or his family

No. Adult Children = Number of children older than 19 years

TABLE 8

Family and Individual Names Associated with Sub-areas of the Teshekpuk Lake Special Area (Figure 17)

Area	Individual	Family	Births	Allotments
1	Aiviq	AHGEAK	c. 1900	no
	Kalayouk	AHNATOOK		no
	Kuutchiuraq	AHNUPKANA		no
	Maska	BROWER		yes
	Phoebe	EDWARDSON		yes
	Sannigak	ERICKLOOK		yes
	Yugayaq	KALEAK		no
		KEOGAK		no
		KIGNAK		yes
		KOMAK		no
		KUNAKNANA	1945	no
		LEAVITT		yes
		NAGEAK		yes
		NAYUKOK	1927-45?	no
		NINGEOK		no
		NUNGASAK		no
		NUSUNGINYA		no
		OKAKOK	c. 1870	no
		PANIGEO		yes
		PAUSANNA		no
		TUKLE		no
		UNAGAROOK	c. 1890-1906	no
2		ELAVGAK	1932-38?	yes
		LEAVITT		yes
		SAKEAGAK	1916-24	no
		SHUGLUK		no
3	Amaguaq	AHSOGEAK		no
		KUNAKNANA		no
		LEAVITT		yes
		NAYUKOK	1927-45	no
		SAKEAGAK	1916-24?	no
4	Agsiinat	ELAVGAK	1932-38?	yes
	Atqana	LEAVITT		no
	Kasak	SAKEAGAK	1916-24?	yes
	Kigatgun			
	Qayana			
	Sithagin			
5	Agnavik	AHKIVGAK	1923	no
	Ilguchiak	AHKIVIANA		no

Area	Individual	Family	Births	Allotments
5(cont'd)				
	Kapuyuk	AHSOGEAK		no
	Qusuk	AIKEN	1929-31	no
		BROWER		no
		EGOWAK		no
		HAGNESS		no (white)
		HOPSON		no
		ITTA	1919-31	yes
		KOGANALUK	1923	no
		LAMPE	1931-39	no
		LEAVITT	1931-43	no
		MORRIS		no
		PANNINGONA		no
		PEDERSON		no (white)
		SAKEAGAK		no
		SHUGLUK		no
		THOMPSON		no
6	Amaulik	AHSOGEAK		no
	Pauluk	EDWARDSON		no
	Qullu	EGOWAK		no
	Tookak	ITTA	1919-31	yes
	Tugruk	LAMPE	1931-37	no
	Ugruak	LEAVITT	1931-43	no
	Uiyurak	OKAKOK		no
7	Kinniviak- (angakut)	ELAVGAK		no
		LEAVITT		no
		SAKEAGAK	1924?	no
8	Qiugak	KEOGAK		no
9	Iguagak	EGOWAK		no
		KOGANAK		no
		PANGINULA		no

Burch (1981) has characterized the Tikirarmiut (people of Point Hope) approach to land use as "comprehensive, not specialized," noting that the Tikirarmiut availed themselves of "all other resources that their country offered." The data collected for the Teshekpuk Lake Special Area Study indicate that this comprehensive approach to land use may not be characteristic of Tikirarmiut alone. As subsistence users harvest whatever resources they can, wherever they can and these locations may vary greatly from season to season, most informants were generally reticent about assigning priorities to specific resources and specific locations. One of the Native allotment owners interviewed requested that the persons making decisions that could effect subsistence users be made to understand that the geographic locus of subsistence use areas is not static: "If you stay in one place you get nothing, that's what subsistence means." She illustrated this by remarking that water levels in the Ikpikpuk drainage were low last fall and nets were set repeatedly at numerous locations in order to obtain the required amounts of fall fish. Her fall fish camp was finally located 20 river-miles distant from the allotment. Arundale and Schneider (1983) report that subsistence opportunities are regarded as a kind of "savings account" that can be relied upon in hard times and this attitude presumably evokes the reticence over assigning priorities to resources and/or areas. All recognized subsistence resource potential is potentially a critical priority.

Keeping in mind the mandatory flexibility of subsistence activities generally, six broad statements characterizing subsistence uses (access, fishing, caribou hunting, waterfowl hunting, hunting and trapping of furbearers, and historic patterns) of the Teshekpuk Lake Special Area were abstracted from the interviews and public testimony:

1. Access

Teshekpuk Lake is almost equidistant (approximately 85 miles) from Barrow and Atqasuk. Nuiqsut lies somewhat closer to the area. Present access to the area is gained by airplane, snowmachine or boat. Formerly, people traveled to the area only by foot, dogsled or boat. Figure 18 shows modes of access. People traveling from Barrow by boat utilize the same routes used in the past. Traveling east along the coast from Barrow, people would turn south down Admiralty Bay or continue eastward around Cape Simpson to reach the Teshekpuk area, Harrison Bay, and the Colville River. Early spring travelers frequently took the route called Mayuagiuraq which connects the lower part of the Alaktak with the Piasuk channel of the Ikpikpuk via a short portage. The portage is reportedly marked by an old anchor which stands erect. From Admiralty Bay people now and in the past ascended the Chipp River and gained access to the upper Ikpikpuk. Near this confluence is the historic site of Isuliumaniq (Figure 16). Today people frequently reach their camps, cabins, and allotments on the Chipp and Ikpikpuk rivers via airplane. After the high water of spring, numerous sandbars provide good landing sites almost anywhere along these two rivers. Some allotment owners have dragged areas on their allotments, removed tussocks, and erected windsocks to create their own landing sites.

BLANK PAGE

BLANK PAGE

BLANK PAGE

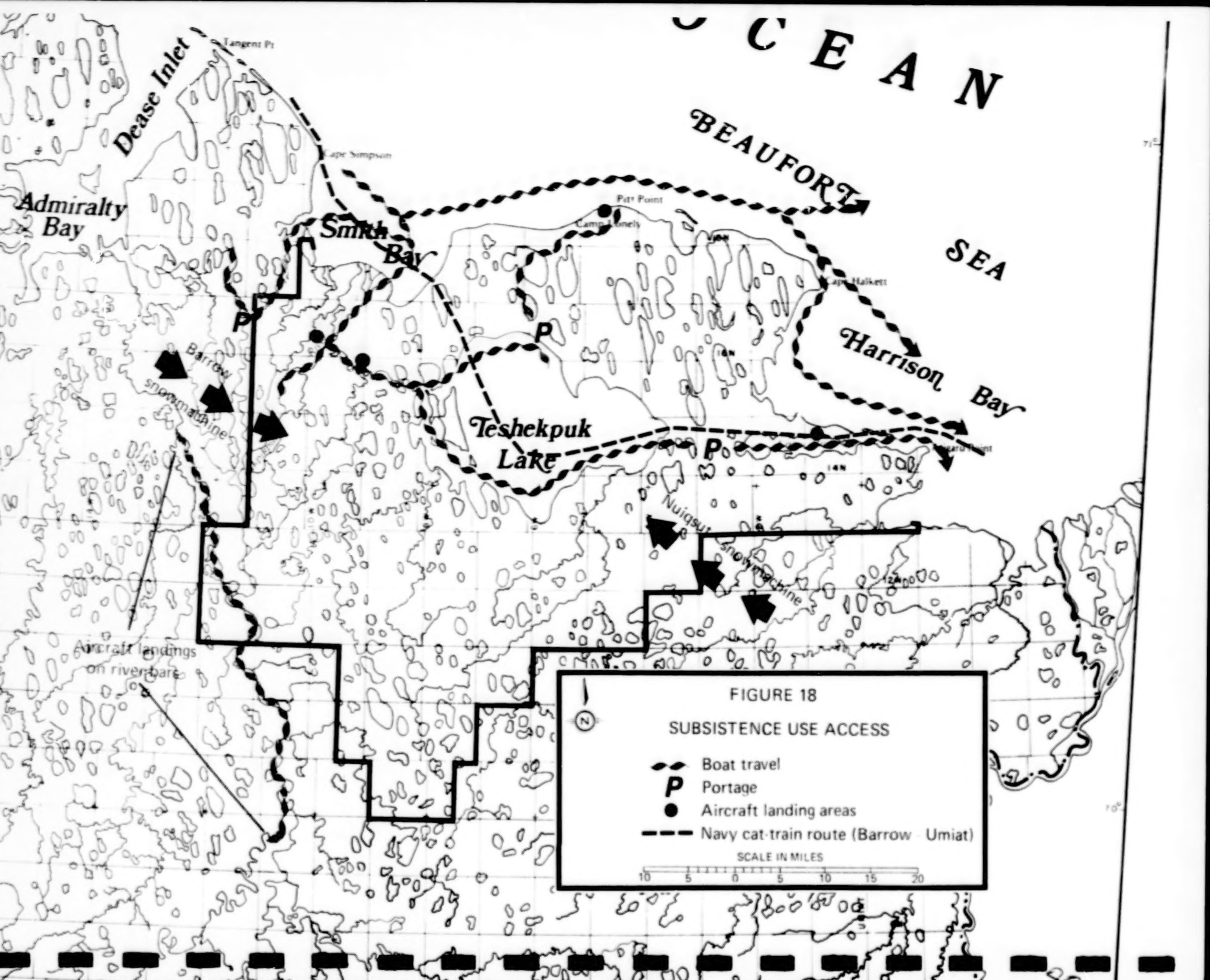


FIGURE 18

SUBSISTENCE USE ACCESS

Whether they reach Smith Bay by rounding Cape Simpson or via the Mayuagiuraq, travelers would ascend the Ikpikpuk via the easternmost channel due to shallow water. Above the mouth of the Mayugiaq, the Ikpikpuk is shallow and does not flow by mid-summer. Not one informant mentioned boat travel from the mouth of the Mayugiaq to Isuliumaniq at the confluence with the Chipp. The Chipp/Akaktak/Ikpikpuk river channels provide ideal terrain for travel by three-wheeler. Many allotment owners in this area keep three-wheelers, boats, motors, snowmachines and all their hunting gear at their camps, which they then reach by charter aircraft.

The Mayugiaq provides direct access by boat to Teshekpuk Lake. In the past, people would make a small portage from the eastern end of Teshekpuk to the head of the Kogru River. No one mentioned using this route today. Charles Brower apparently used this portage to Harrison Bay in 1894 (Brower 1942). When the weather and ice conditions were good, boat travelers heading east would just follow the coast from Drew Point to the trade encampment at Nigliq and beyond. Elders Puiquitkaat (NSB 1980) also report that Harrison Bay was crossed directly from Cape Halkett to Oliktok Point.

Except for a short portage to the north shore of Teshekpuk Lake, people could travel by boat from Pitt Point to Teshekpuk via the Smith River, Naluakruk Lake, and a series of interconnected lakes.

Winter travel, formerly by dogsled and today by snowmachine, is unimpeded and aided by wind-packed snow conditions and relatively flat terrain. During March when there is considerable daylight, skidoo travelers will range as far as 60 miles from a basecamp or allotment in pursuit of subsistence species. The east side of Teshekpuk Lake is frequently reached by snowmachine travelers from Barrow. Often, the abandoned DEW Line station on the north side of the Kogru River was used for shelter on these long spring travels. Snow machine travel between Nuiqsut and Barrow was mentioned as having occurred, but apparently not recently. One informant once used a surplused "Weasel" (tracked personnel carrier) to run a trapline south of Teshekpuk Lake.

A landing strip at Iqsinnat, at the confluence of the Mayugiaq and the Ikpikpuk and another at Suqlait (Figure 16) provide access to the allotments along the Mayugiaq. Boats are stored at Iqsinnat. No use was reported of the airstrips on the northwest shore of Teshekpuk, at Lonely and at the DEW Line site on Kogru River.

The prominent point on the north shore of Teshekpuk is reported as a dangerous area. Inupiat guides directing Navy cat-trains traveling between Barrow and Umiat in the late 1940s steered the trains along the western and southern shores of the lake to avoid this dangerous area. Numerous reports of sightings of big fish in Teshekpuk Lake and of swimming caribou mysteriously vanishing were made. Teshekpuk Lake was not a safe place for kayakers (Brower 1942).

Formerly, overland travel during the summer months was accomplished by foot. Dogs were used to pack meat and gear in the summer and were also harnessed to sleds to pull loads along swampy travel routes. Sleds may still be seen in use during the summertime, although they are now pulled by snowmachines.

2. Fish

a. Fisheries Resource

(1). Existing Environment

The Teshekpuk Lake region contains numerous lakes ranging in size from small potholes (less than one acre) to Teshekpuk Lake (200,000 acres). The lakes within TLSA and the Arctic Coastal Plain generally tend to be shallow: less than 2m (6 ft.) (Hablett 1979). However, a number of deep lakes are found within an area south of Teshekpuk Lake (Figure 19 and Appendix VI, Map 4) (Mellor 1982). These deep lakes provide year-round habitat for fish, while the shallower lakes may only support fish during seasonal periods. For a detailed location of these deep lakes, see Appendix VI, Map 4.

The rivers and streams within the area are generally shallow and have different seasonal-flow characteristics. The flows are highest a few weeks after breakup, with many of the tributaries becoming discontinuous by mid-summer (Hablett 1979). During the winter months the flows are very low if at all, consequently only a limited amount of overwintering habitat is available within the rivers and streams of the region. There are also many beaded streams within TLSA which provide migration corridors for fish during periods of high water. However, these streams diminish during the summer and are of limited habitat value to fish (Hablett 1979).

Species abundance and diversity varies throughout the TLSA. Bendock and Burr (1984) found that species diversity along the Arctic Coastal Plain is the greatest within the area south of Teshekpuk Lake. During their 1983 study, Bendock and Burr (1984) found 17 species of freshwater fish within TLSA.

(2) Key Species

The major species that occur within TLSA are arctic grayling (*Thymallus arcticus*), broad whitefish (*Coregonus nasus*), humpback whitefish (*Coregonus pidschian*), least cisco (*Coregonus sardinella*), arctic char (*Salvelinus alpinus*) and lake trout (*Salvelinus namaycush*). For a complete list of fish species see Alaska Regional Profiles - Arctic Region (Selkregg 1975).

The least cisco was the most widespread species of freshwater fish found during the 1983 survey (Bendock and Burr 1984). During their survey, Bendock and Burr (1984) found least cisco in 60% of the lakes they surveyed and in at least part of every major drainage within their survey area. The second most frequently encountered species was the lake trout, and it was found in 42% of the lakes surveyed. The presence of lake trout found during this survey (Bendock and Burr 1984) extends the reported range of this species. Other species that were widely distributed throughout TLSA as described in Bendock and Burr (1984) were broad whitefish and grayling.

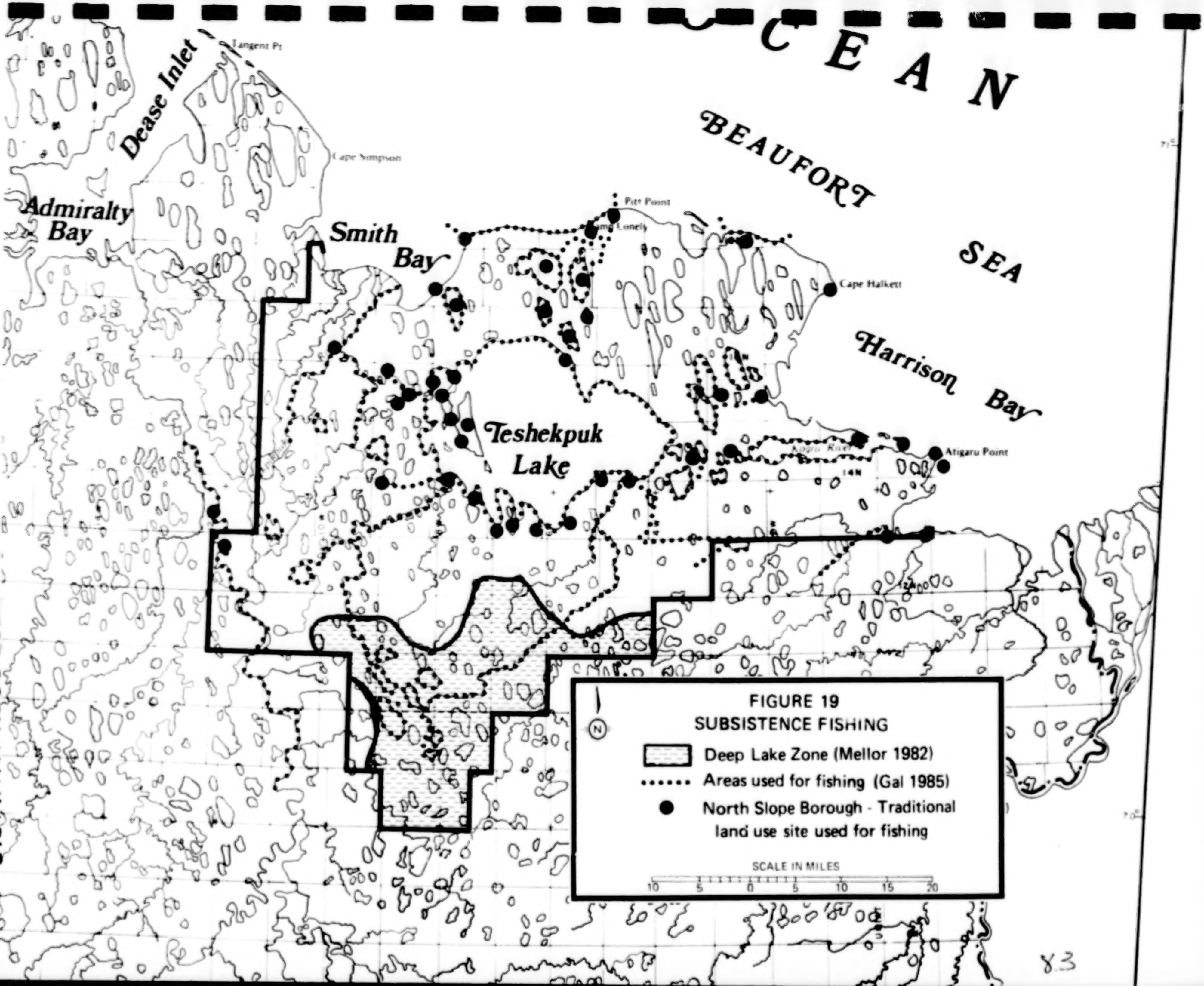


FIGURE 19
SUBSISTENCE FISHING

(3) Discussion - Sensitivity to Impacts

As discussed earlier under waterbirds and caribou, impacts associated with oil and gas exploration activities can generally be avoided by appropriate seasonal and locational stipulations (Appendix II). However, permanent facilities along with activities associated with oil and gas developement may not be totally avoided.

The same potential impacts associated with aquatic systems during exploration activities can also be associated with development activities. In addition, developed oil and gas fields require more surface disturbance activities and water use than fields during exploration.

Alteration, loss, and contamination of aquatic habitats and direct mortality are several of the major types of impacts that could affect fisheries populations within TLSA.

(a) Alteration of Habitats

Activities associated with oil and gas exploration and development could eliminate, reduce or alter aquatic habitats within TLSA.

Due to limited fisheries surveys within TLSA, important aquatic habitats that are used for migration, spawning and overwintering have not been specifically identified. However, in comparing the depths of lakes and rivers in conjunction with the ice thicknesses during the winter, it appears that spawning and overwintering areas are limited within the Arctic Coastal Plain. Those lakes south of Teshekpuk Lake contain the bulk of deep lake habitats within the Arctic Coastal Plain (J. C. Mellor, BLM, personal communication).

Any alteration, reduction or loss of these limited important habitats could cause a significant impact to the fisheries populations within TLSA. All activities proposed within areas of lakes or rivers where a fisheries potential exists should be conducted with due regard for natural drainage patterns and water quality.

(b) Contamination

As discussed earlier in the waterbird and caribou sections, environmental contamination could occur during any oil and gas exploration and development operation.

Contamination of any type can be a particular problem for a fisheries since fish are very vulnerable when concentrated in limited areas for spawning and overwintering. Any contamination of a hydrologic system within TLSA by oil, drilling mud additives, fuels, hazardous chemicals and heavy metals could be significant depending on the degree and location of the contamination. Contamination of isolated small lakes with no outlets could cause a major localized reduction in population numbers, but would probably not have a significant effect on the fisheries populations within TLSA as a whole. However, contamination of Teshekpuk Lake, its tributaries or any major stream or river could cause significant effects on the overall fisheries populations within TLSA.

Because of the susceptibility of aquatic systems to contamination, all operations within the TLSA should develop and implement a contamination prevention plan prior to any activity occurring.

(c) Direct Mortality

Activities such as seismic, drilling and water withdrawal from lakes and rivers during the winter months have the potential for direct impacts on fish.

Explosives were used in many seismic operations during the U.S. Navy and USGS exploration programs. However, these type of operations were for the most part replaced by vibroseis technique in the early 1980s.

Drilling operations require large amounts of water which is relatively scarce during the winter months. Because water is very limited during the winter season, the potential for impacts from pollution and possible dewatering of lakes and streams is increased dramatically.

Removal of water from beneath ice-covered lakes can create serious problems to fish populations. It is obvious that fish kills will occur if all of the water is removed from lakes containing a fish population; however, fish kills can also occur if only a portion of the water is removed. This is due mainly to the buildup of waste products and the decreased oxygen content caused by the crowding of fish into a confined volume of water that may not be large enough to support the population (U.S. Dept. of Interior 1978b). In addition, dewatering of gravels along lake shores and river bottoms could cause a reduction in fish populations due to the loss of fish eggs deposited in these gravels (U.S. Dept. of Interior 1978b).

Water sources used for drilling operations should be inventoried for fisheries data prior to using those sources and/or sufficient water should be maintained within the water source to allow for the possibility of overwintering fish.

b. Subsistence Fishing

Fishing is probably the most significant subsistence resource of the Teshekpuk Lake Special Area. Pike, grayling, laketrout, burbot and several species of cisco and whitefish are reported. Char, smelts and tomcods are taken along the ocean and bay shores. Fish are taken in nets throughout the summer months and some allotments are continuously occupied from June through October while fish are harvested. Fish are preserved by drying or freezing. Ice cellars are common in the Teshekpuk Lake Special Area and are a good indicator of important subsistence harvest areas. Cellars are constructed even when people live in tents and are not necessarily associated with principal (winter) residences such as at Suqlait. A properly constructed cellar will freeze an eight-10 pound whitefish in one day in the summertime.

Fishing is heaviest in the fall, right after freeze-up, when nets are set through the ice. Nets are set through river ice to take advantage of fish migrations. However, it is commonly reported that better-tasting fish come from lakes right after freeze-up and the first snowfall. Snowmachine sleds are used to search out the lakes that have plentiful fish. Various lakes may be tried before an acceptable catch for a given "set" period is attained.

Harvest figures are difficult to estimate since "self-reporting" has not been successful (J Trent, ADF&G, personal communication). Upon direct question, informants were reluctant to estimate the amount of fish they harvested from the Teshekpuk Lake Special Area. However, in the course of general discussion, "twenty sacks" (a sack being 50 pounds) was mentioned by a number of persons. It is suspected that the mention of this figure is not coincidental as 1,000 lbs. is close to weight limitation imposed on commonly used charter aircraft. Those camps or allotments that are occupied for extended periods may be visited by charter aircraft numerous times before they are abandoned for the winter; each time, subsistence foods may be shipped to Barrow on the return trip. The estimate of 1,000 pounds of fish should therefore be considered a minimum figure.

Figure 19 combines two data sets that indicate fishing areas: the lakes, rivers and streams indicated as fisheries by people interviewed in January 1985 (Gal 1985) and Traditional Land Use Inventory sites (indicated by the dots on figure 19) which are specifically designated as fishing areas in the inventory. The agreement of these two independent data sets, obtained 10 years apart, attests to the continuity of subsistence knowledge.

3. Caribou

a. Caribou Resources

Caribou resources have been discussed in a previous section of Chapter 2.

b. Caribou Hunting

When the elder informants lived year round in the Teshekpuk Lake Special Area, the area north and east of Teshekpuk was used as reindeer summer range; caribou were hunted south of the lake. The Kogru River, Teshekpuk Lake and Smith Bay formed a natural barrier for controlling insect-harried reindeer, leaving only small land areas across which reindeer might bolt and subsequently disperse. Winds and open water along coastal areas provided reindeer some relief from insects. The oldest informants who lived in the Teshekpuk Special Area during herding days recall times when caribou were scarce and people walked with pack dogs in the summertime as far south as Knifeblade Ridge and as far west as Lookout Ridge in pursuit of caribou.

Today caribou are taken by subsistence hunters year round (Figure 20). During the spring, animals are taken in conjunction with furbearer hunting. Later in the spring, caribou are taken in conjunction with goose hunting. At these times hunters are utilizing snowmachines for transportation.

Caribou are hunted from boats during the summer season. At that time, hunters continually scan the banks of river, lake and bay for caribou. Seals may also be taken from coastal areas. Younger hunters have used the Mayuagiuraq in recent years to increase access to inland areas for caribou hunting.

During the Department of the Interior's oil and gas exploration program, Gal and Hall unsuccessfully searched the vicinity of Pitt Point for a site

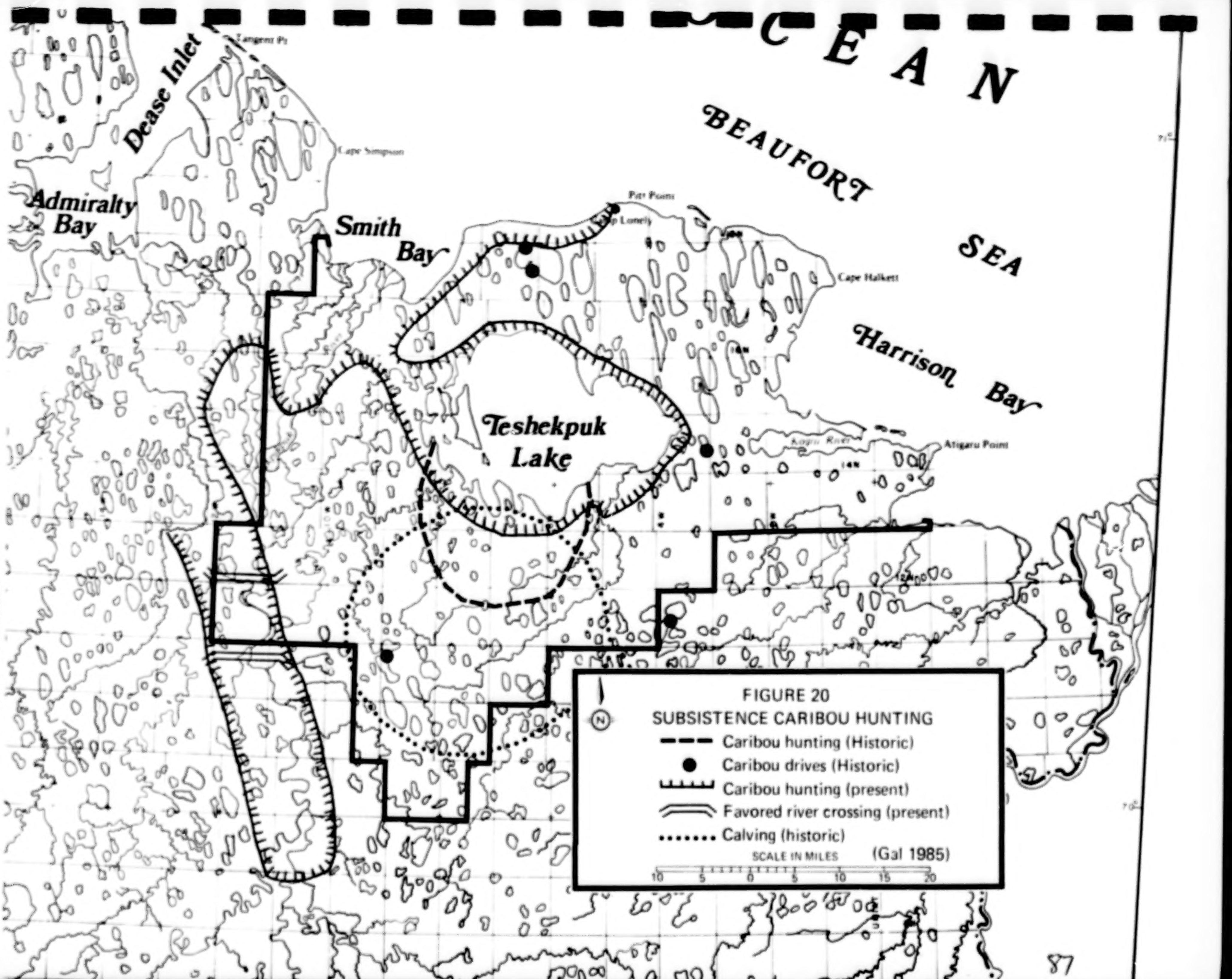


FIGURE 20
SUBSISTENCE CARIBOU HUNTING

(Gal 1985)

utilized for driving caribou. This site was observed in 1837 and described by Dease and Simpson (1838) as consisting of "two double rows of turf, set up on a ridge of ground enclosing a hollow four miles by two, the end farthest from the beach terminating in a lake, into which the unsuspecting animals are driven and there dispatched with spears." One informant recalled that sod "inuksuich" (literally means "like a man;" pylons used to help drive the animals) were used to drive caribou at Naluakruk Lake, just west of Pitt Point and Qalluvik. Caribou were driven off both the north and south points of Naluakruk Lake into the water where they were dispatched from kayaks. Brower (1942) in 1894 took part in a caribou drive just east of the east end of Teshekpuk Lake. "Inuksuich" of sods were also utilized in this drive. Arundale and Schneider (1983) describe a winter caribou drive site known as "Qiukkam Imanga" located in the southwestern part of the Teshekpuk Lake Special Area. At this site the "inuksuich" were made of blocks of snow which directed the caribou into pit traps dug into snowbanks along the shore of the lake. Another probable caribou drive site is located near the Kalikpik River just southeast of the Special Area. This site is described as a thick bed of caribou bones lying along a creek bottom which breaches a narrow isthmus between two large lakes.

These caribou drive sites likely date to the late prehistoric period (roughly the 400 years before contact with Western Europeans) and prompt some interesting speculation. Were these drive sites used by people who belonged to the Colville River Society or to the Arctic Coastal Plain Society? Or could there have been another society, whose winter villages were located along the coast and have now totally vanished like Imagruaq) due to the rapidly eroding coast? Nevertheless, the presence of these caribou drive locations suggests that caribou, if not the Teshekpuk Herd, have been abundantly available for some time.

4. Waterbirds

a. Waterbird Resources

Waterbird resources have been discussed in a previous section of Chapter 2.

b. Waterfowl Hunting

It is difficult to assess the importance of waterfowl relative to other species harvested by subsistence hunters in the Teshekpuk Lake Special Area. Fall hunts of birds staging for their southward migration were not mentioned by informants. Spring goose hunting was frequently, though not prominently, mentioned. The arrival of waterfowl not only announces the coming summer, but also provides a welcome addition to the diet. Waterfowl hunting may be as important for psychological as for physiological sustenance. No harvest estimates can be made. Areas used for goose hunting in the springtime are delineated in Figure 21.

In earlier times geese were efficiently harvested during their molt. Four lakes were identified by informants as the location of goose drives. The physiographic situation at each lake is the same--each lake has a small outlet stream. A kayak would be launched and used to herd molting birds into the

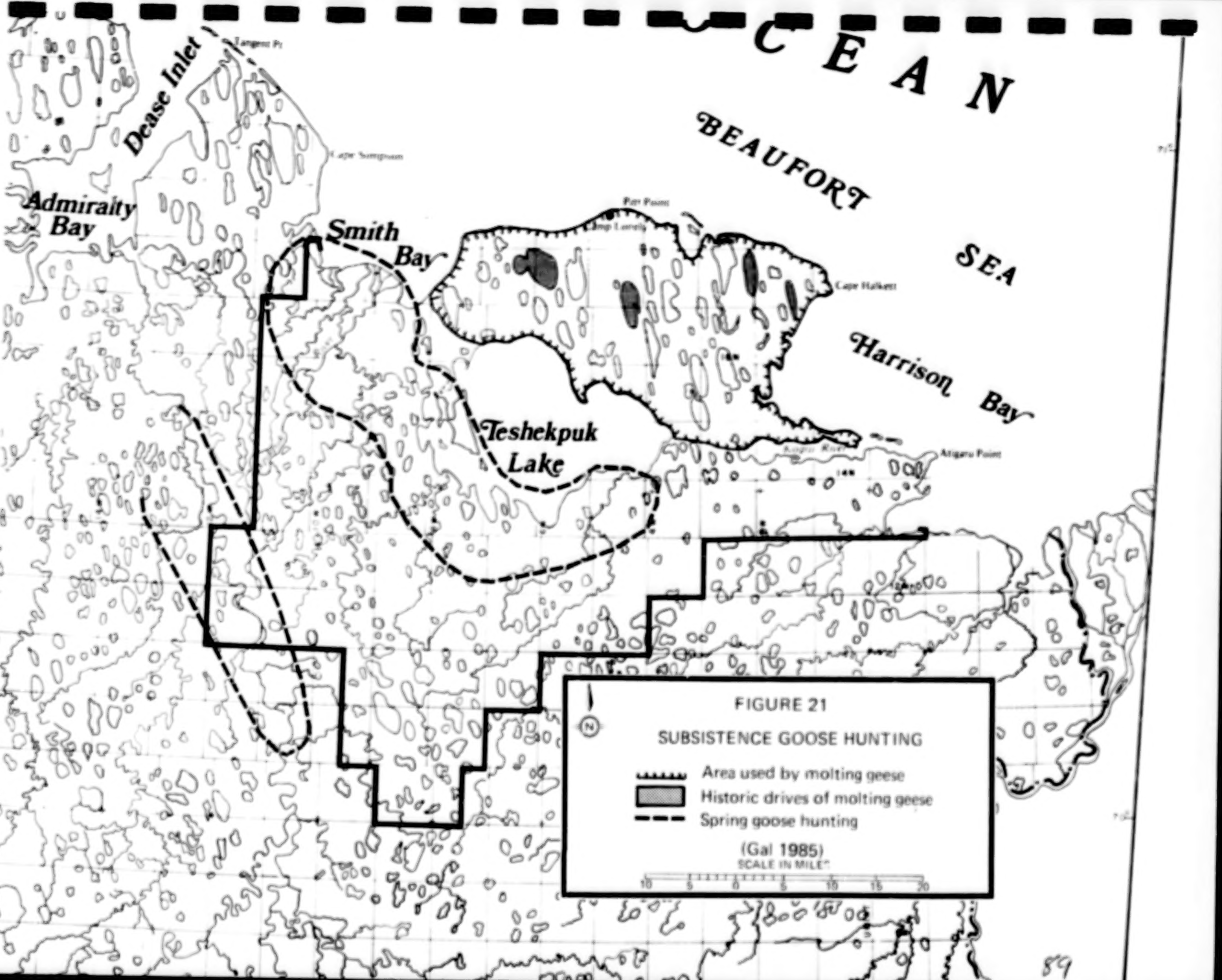


FIGURE 21

SUBSISTENCE GOOSE HUNTING

(Gal 1985)

confines of the outlet streams or an adjacent shallow lake. There the birds would be clubbed; as many as 700 birds would be taken at once. Most of the birds were stored in ice cellars for winter use. While no one reports driving birds recently, the effectiveness of this harvest technique and the molting area where it can be employed are generally known by the older informants.

5. Furbearers

The area south of Teshekpuk Lake is generally recognized as good country for obtaining wolf, wolverine and fox (Figure 22). The area is attractive to furbearers, according to informants, because its sandy banks make ideal denning habitat, it is an area where caribou calve, and because the snow vanishes from the area early in summer.

Though many people once trapped in the area, no one reported trapping in the area recently. One informant last trapped the area four years ago. Furbearers are taken in the area today by hunting from snowmachines. With the long daylight in the spring, hunters follow any tracks they come across. Provided a wind does not obliterate the tracks, a skidoo will eventually overtake any animal. Future cash shortages may cause a return to trapping.

6. Historic Patterns

Three communities were occupied in the Teshekpuk Lake Special Area from about 1920 to the mid-1940s (Figure 16). These communities were, from west to east: Imagruaq, Qalluvik, and Isuk (Isuk is also known as Halkett; the TLUI incorrectly lists them as separate communities). Nothing remains of the houses at Imagruaq due to coastal erosion. Likewise, of more than a half-dozen houses that once stood at Isuk, only a single house remains. Qalluvik seems to have fared better than the other two communities; a number of house pit and ice cellar depressions are discernable, two structures are still standing, and a number of marked and unmarked graves are visible. It is not known whether these three sites were occupied before 1920. Simpson and Dease did not note any villages along this section of the coast in 1837.

Families that wintered at Imagruaq and Qalluvik practiced essentially the same seasonal cycle of settlement and subsistence activity. Just before breakup people would travel by dogsled to their summer fishing camp, Suqlait, on the Mayugiaq River. In the early spring, bird's eggs would be collected, cooked, placed in pokes and stored in the ice cellar. June and July would be spent fishing and fish would be frozen or dried. Sometimes people waited until after breakup to travel to Suqlait by boat. In August, families would move camp to the south shore of Teshekpuk Lake where they would fish at stream mouths. Hunters would line boats up the small rivers and hunt ground squirrels for their pelts. Their main objective, however, was enough caribou to obtain suitable hides for winter clothing. Families would then return to Suqlait or Imagruaq or Qalluvik and possibly engage in a goose drive. Some might fish off the beach. When winter set in, the families would be re-established in their houses on the coast. Seal nets would be set at breathing holes; lead hunting was not practiced because the leads opened too far offshore. Once the sun started to return, traplines would be set around Teshekpuk Lake and south of the lake. Food stored in the cellars at Suqlait would be transported to Qalluvik or Imagruaq by dogsled.

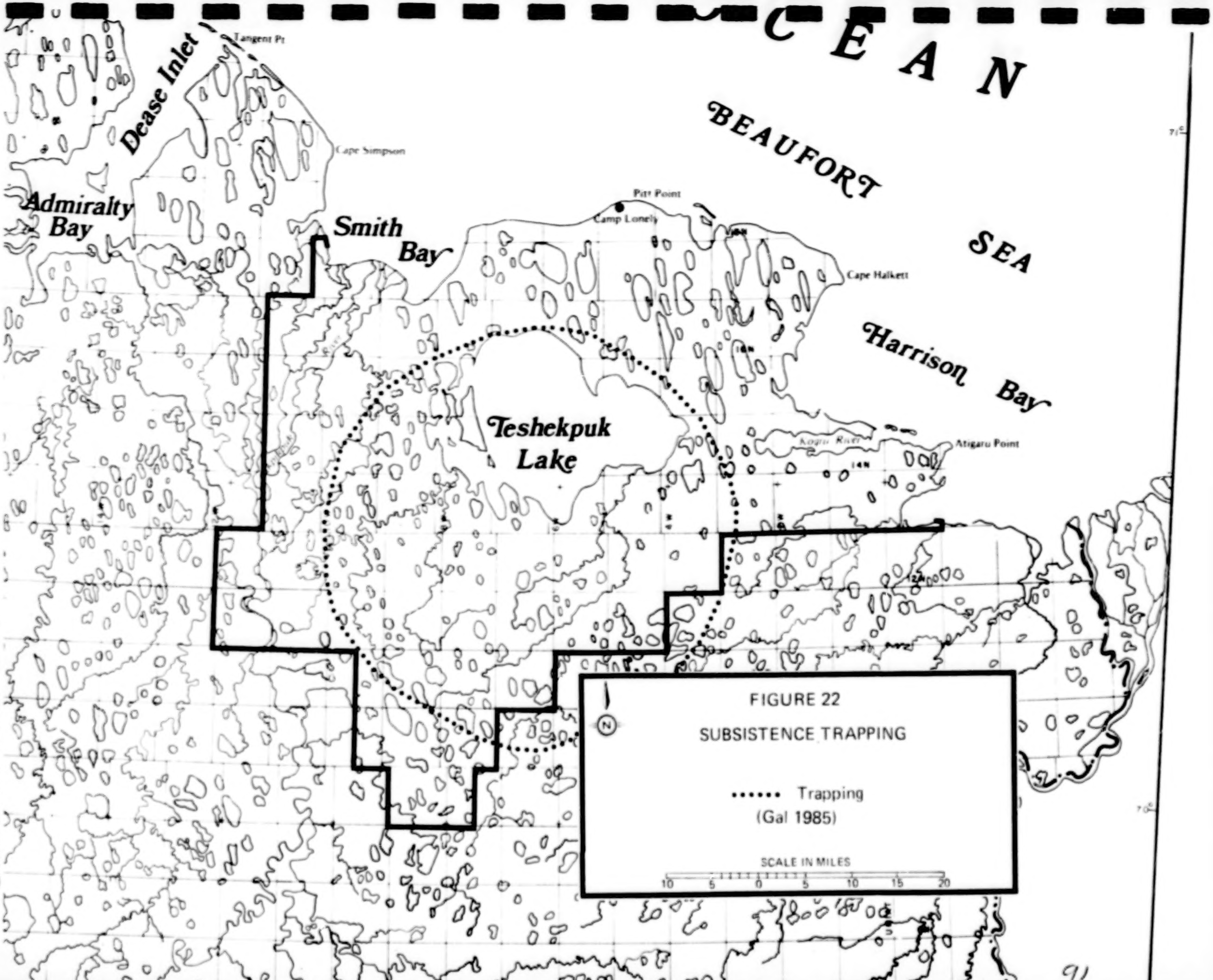


FIGURE 22
SUBSISTENCE TRAPPING

The pattern was similar for the people who lived at Isuk (Halkett). Dogsleds were driven across the summer tundra to effect the move to summer fish camps on the lake and river system between Teshekpuk Lake and the Kogru River. Fish, caribou and fowl were stored in ice cellars here, too. Cabins in this same area were built and used by families running traplines in the winter.

D. Dynamics of Subsistence Use

1. Methodological Considerations: Creating a Cultural Map

Fluctuating resource availability and distributions and changing subsistence needs in the context of an unstable mixed cash and subsistence economic situation make the answers to the specific questions posed at the beginning of the analysis difficult to answer simply. Persons interviewed for the Teshekpuk Lake Special Area Study emphasized how the area could be used for subsistence activities rather than indicating which areas were being used. This emphasis is reflective of the subsistence users' recognition of the dynamic nature of subsistence harvest and anxiety over rigid designations of subsistence use areas. It is commonly recognized that a resource can fail dramatically in an area from one season to the next. Thus the successful hunter must actively ascertain and preserve an array of opportunities in the event that his initial predictions about resource availability prove faulty at any time. A successful subsistence lifestyle is predicated upon systematic knowledge of animal behavior and skills in interpreting the ecological situation. The significance of harvest figures and intensity of subsistence use of the Teshekpuk Lake Special Area, even if such were available, could not be assessed unless the cyclic fluctuations of subsistence species were known and subsistence needs could be accurately projected. Therefore, a methodology was developed to identify important areas for subsistence by emphasizing how the socio-cultural system of subsistence action directs the harvest of resources rather than what resources are harvested.

"Action," as used here, follows the usage of Parsons (1966) and "consists of the structures and processes by which human beings form meaningful intentions and, more or less successfully, implement them in concrete situations." "Action" is preferred to "behavior" because it includes not only the physical events (subsistence uses as defined in Section 803 of ANILCA) of subsistence lifestyles but the patterning of these events and their patterned meaningful products. "Sociocultural system of subsistence action" encompasses where and when resources are harvested, the organization of individuals into cooperative work groups, items of technology, practical and supernatural lore, methods for acquiring, maintaining and exchanging information, etc.

Laughlin (1972) defines three "indispensable" parts of a subsistence hunting system: 1) the habit of observation 2) a systematic knowledge of animal behavior 3) "the interpretation and appropriate action for living with animals and for utilizing them for food and fabricational purposes." Laughlin also notes the "ubiquity of sophisticated information among hunters." These three parts of the hunting system are articulated in a sociocultural system of information exchange and subsistence action. Laughlin's characterization of subsistence hunting in general is useful for understanding Inupiat subsistence activities and for developing a means for assessing the relative subsistence value of geographic sub-areas within the Teshekpuk Lake Special Area.

Hall (1983) recognized the significance of the acquisition and dissemination of subsistence data among Inupiat hunters and suggested that even if a subsistence site or practice is not currently being utilized, "Knowledge of its existence and nature, and the right to exploit it, are available to any who may someday have need of..." utilizing the site or practice. One of Hall's (1983) informants during the subsistence study for the Brontosaurus well near Barrow "...spoke of searching out a place he had learned about from his father long before and finding excellent fishing as his father described." Burch (1980) also discusses the importance of information exchange through conversation and indicates the traditional "conversational focii...were the set of male and female members, respectively, of an extended family."

Hall (1983) has conceptualized the repository of subsistence knowledge on two levels. At the level of the individual, Hall has proposed the notion of the "personal subsistence map." On such maps he envisions "all the places used by an individual during his or her lifetime for subsistence purposes and the experiences associated with each place." Hall suggests that personal subsistence maps have time depth because "their data are reinforced and expanded by oral traditions which carry subsistence associations back in time." At another level, Hall (1983) sees the collectivity of individual subsistence maps as representing "a cultural map of the subsistence potential of northern Alaska." Hall developed the concepts of the individual "subsistence map" and the "cultural map of subsistence potential" to underscore his observation of a general Inupiat perception "that any diminishment of potential subsistence resources, by whatever causal factor, endangers the future ability of the Inupiat to maintain the Inupiat character of life." However, the concepts of individual subsistence maps and cultural maps of subsistence potential may be incorporated into a model depicting the likelihood of use of areas for subsistence activities.

The maps created during the separate interview sessions with the Teshekpuk informants are considered to constitute rudimentary individual subsistence maps as conceived by Hall (1983). Informants were asked to identify specific areas and uses within the Teshekpuk Lake Special Area. Informants were not asked to limit their responses to a particular period of time; that is, data pertaining to subsistence activities of last week or last season were recorded as well as reports of subsistence activities recalled by a grandparent. The typical interview lasted for approximately one hour; informants were told they would be interviewed once but would be provided an opportunity to review a draft of the report. Due to the time constraints and the structure of the interviews, it is assumed that the data recorded on the maps represent priority abstracts of "personal subsistence maps." These maps contrast with the more usual subsistence land use mapping approach (Pedersen 1979) which is premised upon maximum areas utilized. This more usual approach was not used as it equally weights priority or habitual use areas and areas of exotic use. The individual subsistence maps, on the other hand, are felt to represent rudimentary perceptions of subsistence opportunities, that is, the opportunities most commonly articulated within the sociocultural system of subsistence action.

The data of the individual subsistence maps were combined to create Figure 23, a map of the subsistence opportunities of the Teshekpuk Lake Special Area. This map is one form of the collective "cultural map" conceptualized by Hall (1983). It depicts the cumulative subsistence assets of the Teshekpuk Lake Special Area perceived by the 39 persons interviewed.

Figure 23 was produced by systematically merging the individual subsistence maps for all resource categories. A three-mile (1/4 township) grid was superimposed over each individual subsistence map. A "1" was placed in a grid square for each resource reported by an informant as occurring at that location. Thus if only fishing occurred within a particular 1/4 township, it would receive the value of "1"; but if that informant reported 4 resource categories for that 1/4 township, then four "1s" would be recorded on the grid. Each individual subsistence map of the 39 informants was tabulated on the 1/4 township grid in this fashion. In the case of the family interviews where one map was created by two or more persons, values were weighted for the number of individuals who contributed information for the map. Thus, if four family members helped produce one map and a 1/4 township was noted for fishing, the value of "4" rather than "1" was recorded. The total score for each 1/4 township was then recorded on the grid and isopleths were plotted at 10-unit intervals to form the composite cultural map of the Teshekpuk Lake Special Area (Figure 23).

2. Interpreting the Cultural Map

The cultural map of the Teshekpuk Lake Special Area (Figure 23) portrays the relative combined subsistence assets presently recognized by Inupiat users. The areas of high opportunity are areas which are referenced by many informants and/or are areas where more than one subsistence resource is available. Values recorded ranged from a low of one response to a high of 44 responses for a single 1/4 township. The contours plotted on Figure 23 represent the 10-, 20-, 30-, and 40-response isopleths. The geographic distinctions made in Figure 23 are not indicative of intensity of use or the concentration of one or more subsistence species. Areas designated as having "high" opportunities are areas which have an increased likelihood of being discussed by the Inupiat for the subsistence values perceived to be present. Over time, the potential use of these areas is more likely to be discussed and consequently these areas are more likely to be visited and utilized for subsistence purposes. These areas therefore have a lowered threshold for enduring, sustained perturbation.

By referring to the earlier characterizations of subsistence use in the Teshekpuk Lake Special Area, the specific activities which will be carried out in the predicted high-use areas (areas frequently acknowledged by Inupiat users for their subsistence assets) can be projected. The 30+ and 40+ response isopleths can be used to project the most important subsistence areas and activities into the near future. Fishing is and will be the most important activity in these areas of highly recognized subsistence potential. Caribou hunting will also continue to be important and will be conducted from fish camps during seasons of open water and in all probability from allotment cabins in the spring and fall when snowmachines can be employed. Goose hunting and furbearer hunting or trapping will also be carried out from these same basecamps.

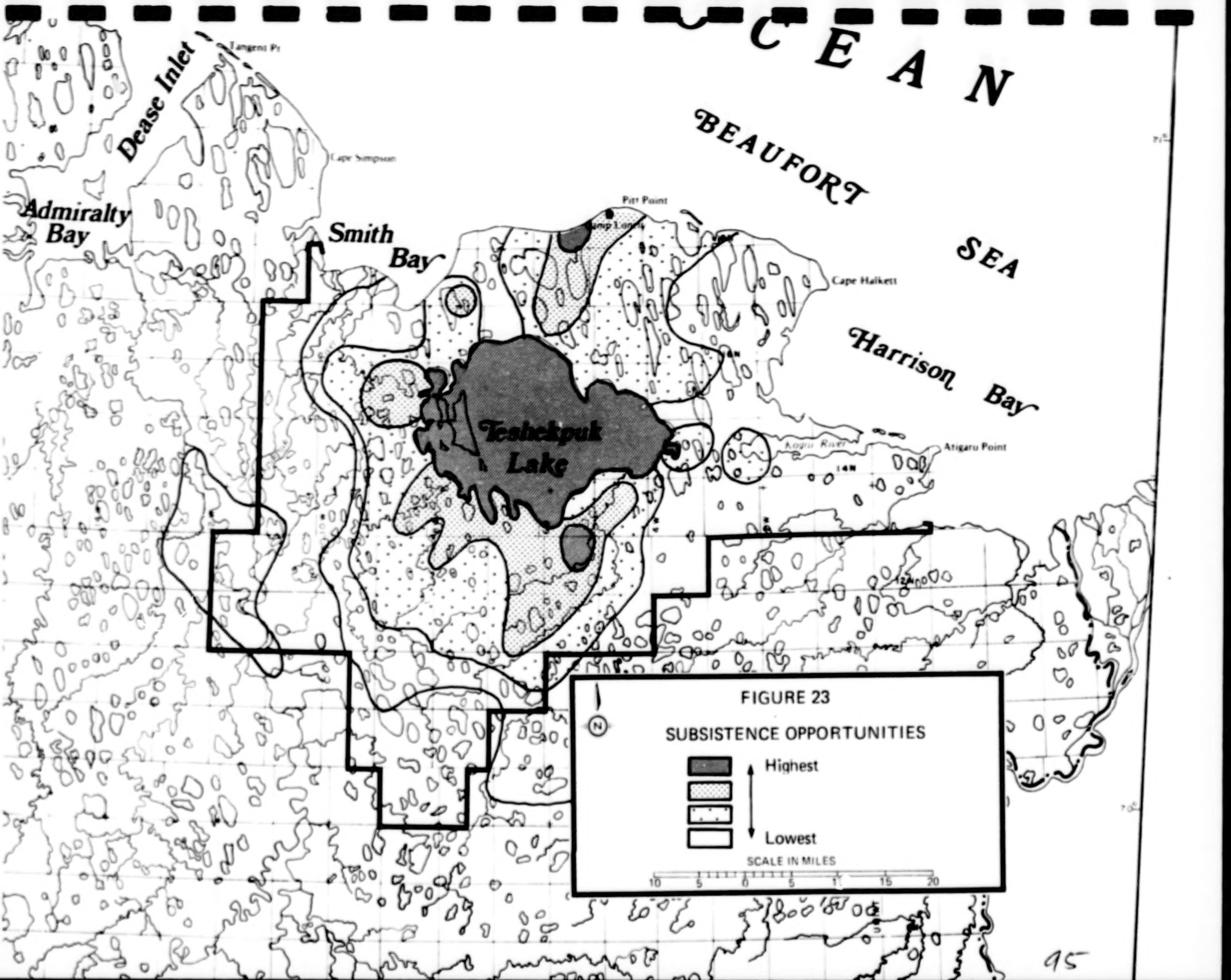


FIGURE 23

SUBSISTENCE OPPORTUNITIES

The cultural map of subsistence opportunities is not static nor can it be used to predict where all subsistence harvests (perhaps crucial harvests) will occur. The cultural map will vary according to the population from which its constituent individual subsistence maps were drawn. Bias in selecting informants may drastically influence the configuration of the cultural map. For example, if the study had focused upon the Ikpikpuk-Chipp-Alaktak drainage rather than the Teshekpuk Lake Special Area, the sample of allotment owners would have been different and the recognized potential of the Ikpikpuk River would also be different. The low responses for the Ikpikpuk River relative to the rest of the Teshekpuk Lake Special Area is considered to be an "edge effect" of the geographic focus. The effect of bias was dismissed as insignificant for this study due to the high percentage of the population of Native allotment owners who were interviewed and the recognition by other Inupiat of certain allotment owners as "experts" with regard to the Teshekpuk Lake Special Area. The lack of success in enticing extensive testimony of occasional use at the workshops may indicate a lack of interest in the proceedings, that the area is little-used by other than allotment owners, or perhaps that there was inappropriate scheduling and advertising of the workshops. Nevertheless, this absence of data is not considered a significant weakness in the data and/or findings.

Inupiat contemplating subsistence activities within the Teshekpuk Lake Special Area, based on their information exchange networks, may have drastically different access, from the complete collective cultural map of subsistence potential; so the patterns of individual exploitation of subsistence resources may not conform to the collective subsistence map. However, over time, the aggregate of individual patterns of exploitation is expected to correspond closely to the cultural map of subsistence potential.

The cultural map of any area can be expected to change as subsistence users' informational needs or interpretations of appropriate actions change and certain bits of knowledge are forgotten. Also, as subsistence users incorporate new observations into their personal subsistence maps and share these observations with others and/or new technologies require new data inputs or interpretations, the collective cultural map will be reconfigured. When knowledgeable persons or acknowledged experts are removed from the subsistence data exchange network by moving away or dying, the configuration of the cultural map may change dramatically.

There are, however, two stabilizing or leveling influences in the sociocultural system of subsistence action. Inupiat elders are highly regarded and acknowledged sources of knowledge. Deference to an elder's expert testimony may heavily influence the body of knowledge shared by a large number of people. Fortunately, this deference is counterbalanced by the cultural value placed upon modesty. This recognition of and deference to elders was displayed at the public meeting in Barrow when one of the persons attending the meeting specifically requested that another attendee address the group because that person had been born, raised and spent his young adult years with the people who herded reindeer at Halkett. Recent efforts of the North Slope Borough to record and disseminate traditional Inupiat knowledge through such modern instruments as the Traditional Land Use Inventories, the

Elders' Conferences and public service radio broadcasts serve to expand the range of influence of the traditionally acknowledged "experts." Published materials, such as Figure 19, now also function as blueprints for subsistence action.

The validity of the assignment of subsistence value to geographic areas on the basis of prevailing subsistence knowledge is intimately related to the sociocultural mechanisms for disseminating that knowledge. The mechanisms for disseminating knowledge about subsistence resources were found to have an exceptionally traditional cast.

3. *Ayaqhaat*: The Role of Social Networks

"Ayaqhaat" is the Inupiaq word for string figures or "cat's cradle." Ayaqhaat is also a place-name referring to a series of large lakes, good for fishing, in the southwestern portion of the Teshekpuk Lake Special Area. Ayaqhaat is used here as a metaphor to describe an Inupiat variant of a highly adaptable social mechanism (Gal 1985) termed "flux" by Turnbull. Turnbull (1968) envisioned flux as "the constant changeover of personnel between local groups and the frequent shifts of campsites through the seasons;" the "recurrent fission and fusion which affects the composition of local bands." Ayaqhaat differs from flux in that intra-settlement relations are founded upon extended family lines. The effects of ayaqhaat are manifest in all aspects of traditional Inupiat existence and the data collected for the Teshekpuk Lake Special Area study suggest that ayaqhaat still strongly influences Inupiat lifestyle.

Ayaqhaat (fission) promotes social cohesion by relieving social tensions as individuals or family segments disperse to take advantage of different or widely, but thinly, dispersed resources, or shift residence between affinal and consanguineal kin, or to trading partner's/co-marriage couple's place of residence. Ayaqhaat (fusion) promotes social cohesion at a variety of levels. Within a socioterritorial unit, relationships within a local family were traditionally reinforced at the *qazgi*, relationships between local families occupying the same territory were reinforced by "feasts," and relationships between socioterritorial units were rejuvenated through trading partnerships, co-marriages, trade fairs, and messenger feasts. Modern extensions and analogues of these traditional integrative institutions are the *nalukataq* and special holiday church suppers.

During the course of the interviewing, the very traditional character of modern use of the Teshekpuk Lake Special Area emerged with respect to two social phenomena: the selection of Native allotment locations in accordance with an apparently kin-based corpus of knowledge of territory and resources and 2) the vigor of a redistribution system (used in its broad sense). Unfortunately, further genealogical work and interviewing is necessary to fully document the tendencies apparent in the data gathered so far.

Genealogical and family history data were obtained both from the Inupiat Office of the North Slope Borough and during the interviews themselves. The interview data is less complete, since the importance of kinship was not realized until the interviews were well underway. Table 6 summarizes the family history data; "question marks" on this table indicate a lack of data. Percentages calculated on the basis of available data (# responses on the Table 6) show tendencies which are not inconsistent with percentages which could be predicted on the basis of Burch's reconstruction of traditional Northwest Alaskan societies. 88% of the allotment owners had parents who used the area after they were married. This figure seems to illustrate the importance of family-based oral traditions in defining "best locations," and lends further credence to Burch's recognition of strong correlation of families (and family knowledge of subsistence potential) with territories.

Burch (1980) has suggested that in the traditional Northwest Alaskan societies "80% of the residential marriages involved spouses from the same society" and that on the arctic slope, the residential marriage rate of spouses from the same society was as high as 90%. Information on the spouse's ties to the Teshekpuk Lake Special Area is currently available only for nine allotment owners who themselves were either born or grew up in the area or whose parents used the area as a conjugal unit. Of this group, roughly 78% had spouses who also were either born or grew up there or whose parents used the area as a conjugal unit. This rate is very close to Burch's suggested range of 80-90% for residential marriages involving spouses of the same society. The practice of marrying within the same socioterritorial unit can be considered an adaptive response which concentrates two different (family) cultural maps of subsistence potential of the same area, in the same household. Interviewing an allotment owner and spouse is likely, on the average, to compound the data return for subsistence researchers. The Teshekpuk data suggest that for the Teshekpuk Lake Special Area, the substance of individual and collective subsistence maps is emphatically transmitted along family lines. Table 7 is compiled from a number of sources, and lists the Inupiaq names of individuals who have been associated with sub-areas of the Teshekpuk Lake Special Area. Family names, the range of birth years of family members born in the Teshekpuk Lake Special Area and whether or not the families have Native allotments in the area are included in the three columns to the right in the chart (this list should be considered preliminary only). The sub-areas are drawn on Figure 17 and were delineated on the basis of discrete areas of use identified from the interviews. Table 7 roughly outlines the information-exchange network and potential subsistence-user network of the Teshekpuk Lake Special Area.

The second current practice which seems to derive from the continuation of traditional Northwest Alaskan Inupiat social existence is the sharing network. One of the earliest interviews revealed that subsistence resources were widely and generously shared. Data elicited in subsequent interviews disclosed that this was a widespread general pattern. The use of allotments and the resources obtained from their hinterlands is principally limited to the extended family. Grandparents, their children, children-in-law, and grandchildren comprise the principal sharing network. However, informants consistently mentioned providing subsistence foods to elders. If elders remark that "It would be good to taste caribou" (or whitefish, or geese), the referenced food is provided, if available, without qualm. Often elders, widows, and others are sought out and given food: "You don't ask, you just give them whatever you got."

The column on the far right of Table 6 shows the number of adult children of the allotment owner. These children, their spouses and children belong to an extended family-sharing network. Thus, adverse effects in the vicinity of an allotment may effect an extensive sharing group easily numbering 50 or 60 people. This sharing network may also be geographically extensive; one informant shipped subsistence foods to every village within the North Slope Borough. There is some indication in the Teshekpuk data that the extended family organization still conveys adaptive value in today's mixed cash and subsistence economy. Numerous writers, such as Hoffman et al. 1978, have emphasized the expense involved in acquiring and maintaining the gear essential for subsistence activities. Specialization and exchange within the extended family affords the group access to both cash-providing and traditional subsistence activities. The observations of Galginaitis et al. (1984) on family composition at Nuiqsut suggest that the coalescence of extended family units is underway in that recently re-established community.

Burch (1980) notes that traditionally the sharing network was confined to the local-family and that "No redistribution system existed on an inter-family level since there was no superordinate position or organization with the authority to collect, not to mention redistribute, anything." Today however, the churches operate a redistribution system. At Thanksgiving and Christmas especially, but also at other times, the churches collect and redistribute subsistence foods to those in need. A number of informants mentioned the custom, still compelling, of cleaning out the ice cellar in the springtime to make room for and appropriately treat subsistence foods whose procurement is anticipated. Whaling captains in particular must be careful to properly prepare their cellars or risk missing a whale. This customary emptying of the ice cellar in the spring distributes resources at a potentially difficult and needy time of year.

The extent of the sharing of almost all of the subsistence resources is judged to be widespread and significant, although researchers have tended to focus only upon the distribution of the products of the whale hunts. Until a researcher can overcome Inupiat anxiety over how harvest data will be used and reticence in providing such data, the importance of the sharing of subsistence resources can only be estimated.

E. Parameters for Protective Measures of Subsistence Resources

"At the outset it must be stressed that hunting, fishing, and gathering activities cannot be discussed solely in terms of harvest areas or current patterns. Animal source areas, migration routes, and seasonal and cyclic variables form a complex network of time/space determinants that in turn determine what, where, and when resources will be harvested. Seasonal or cyclic failure of a primary resource may completely alter 'normal' patterns, forcing reliance on different geographic areas and species. An entire drainage may be the source area for a given fish camp. It is not possible, therefore, to delineate restricted zones of current or primary subsistence activity and leave the rest of the map open to other best-use assignments. If hunters and hunted require extensive ranges, which change over time and from season to season, then development activities should be restricted to the smallest possible areas, and the logistical connections between development sites should not be allowed to fragment extensive hinterlands." (U.S. Department of the Interior 1978a).

The parameters for insuring the continuation of a subsistence lifestyle have not changed since 1978. The successful subsistence user must maintain flexibility and take advantage of resources when and where opportunity presents itself. To accommodate the flexibility required by subsistence use, land management should seek to preserve as full a range of options for subsistence users as possible. Three general protective measures in this regard would be:

Protective Measures

-limit habitat loss by minimizing development size,

-locate corridors for development so as to not bisect important ecosystems, and

-avoid authorization of uses which preempt subsistence activities or which restrict access to subsistence resources.

Specific actions can be taken with respect to the general protective measures within the Teshekpuk Lake Special Area. The areas of predicted long-term habitual use (those areas covered by the two highest subsistence opportunity categories in Figure 23 and the near-vicinity of Native allotments identified in Figure 16) should be protected by prohibitions of all activities potentially disruptive of subsistence activities and resources. This protection should be afforded also to the subsistence fisheries identified in Figure 19.

Unlike the wide potential distribution of mobile terrestrial mammals, aquatic habitat can be easily identified. Therefore, the application of the subsistence fisheries stipulation (Appendix II) which prohibits activities within 1/4 mile of aquatic habitat (lakes, streams and marine habitats indicated on Figure 19 and Appendix VI, Map 4), will adequately protect this subsistence option. Due to the size of Teshekpuk Lake, the application of the subsistence fisheries stipulation eliminates a vast area for other uses.

The subsistence lifestyle stipulation should be applied to all lease tracts and other activities whose operations fall within the 10-response isopleth (first designated level of subsistence opportunity). In addition, the subsistence lifestyle stipulation should be applied to activities whose operations are within the proximity of all North Slope Boroughs TLUI sites and Native allotments as designated on Figures 16, 19 and 23. The 10-response isopleth was selected because it indicates the information exchange and resource redistribution networks of at least two extended families. The 10-response isopleth also encompasses most of the NSB traditional land use inventory sites and Native allotments, which have in the past been used to apply the subsistence lifestyle stipulation. Assignment of this stipulation will insure that a study is conducted so that an absolutely current evaluation of subsistence use is available to design adequate stipulations for the proposed activity. While in most cases the application of this stipulation will eliminate or minimize effects on subsistence use, significant adverse impacts may still be allowed, but only after management has carefully reviewed its options and publicly disclosed the consequences of its decisions according to the provisions of Title VIII of ANILCA.

New opportunities for the public participation of Inupiat in decision-making should be explored. Management and studies prepared for management should also recognize the psycho-social dimension of subsistence. Ayaqhaat and subsistence endeavor to combine still, and will probably continue, to make "... the environment, in general, and one's own hunting territory in particular, become for each individual the one reliable and rewarding focus of his attention, his loyalty, and his devotion."(Turnbull 1968).

BLANK PAGE

CHAPTER 3

SUMMARY OF PROTECTIVE MEASURES FOR COMBINED VALUES

I. INTRODUCTION

The protective measures in this document have been formulated for Alaskan arctic values specific to TLSA biological populations and subsistence uses, and result from the analysis of available studies and literature review. They are intended to protect crucial habitat and wildlife values and subsistence uses within the TLSA.

Biological and subsistence values within the Teshekpuk Lake Special Area will require special protective measures if development occurs. Any oil and gas exploration and/or development that does occur within the TLSA will be: (1) analyzed with the biological and subsistence values in this study, (2) designed with reasonable estimates of development needs throughout the life of the field, which would be identified in a future development EIS, (3) stipulated to ensure protection of the crucial biological and subsistence values, and (4) closely monitored to guarantee adherence to stipulations.

II. COMBINED PROTECTIVE MEASURES FOR BIOLOGICAL AND SUBSISTENCE VALUES

The TLSA can be divided into three zones based on biological values and subsistence uses and their sensitivity to oil and gas related activities (Figure 24).

The following is a compilation of waterbird, caribou and subsistence measures that protect surface values that may be impacted by oil and gas leasing and other development activities.

A. Zone 1 - Figure 24

This is the most sensitive zone within the TLSA, and is crucial for a combination of resource values. This zone contains most of the crucial molting and staging habitat for black brant, as well as nesting, molting and staging habitats for other geese, ducks, swans and shorebirds. Because of the high concentrations of black brant and other waterfowl species and due to treaties between the U.S., USSR, Mexico and Canada on these species, the area is of international significance. Recent observations have documented that during molting and staging (June 1 thru September 30), black brant and other geese are disturbed by even low levels of human activities.

This zone is of significant importance to the resident caribou herd. Most of the important and sensitive use areas, such as calving and insect relief areas, are found in Zone 1. During the spring calving period (May 15 thru June 30) and the insect relief period (July 1 thru July 31), most of the animals form large aggregations within these important-use areas. Caribou are most sensitive during aggregate periods, and any disturbances are likely to

BEST COPY AVAILABLE

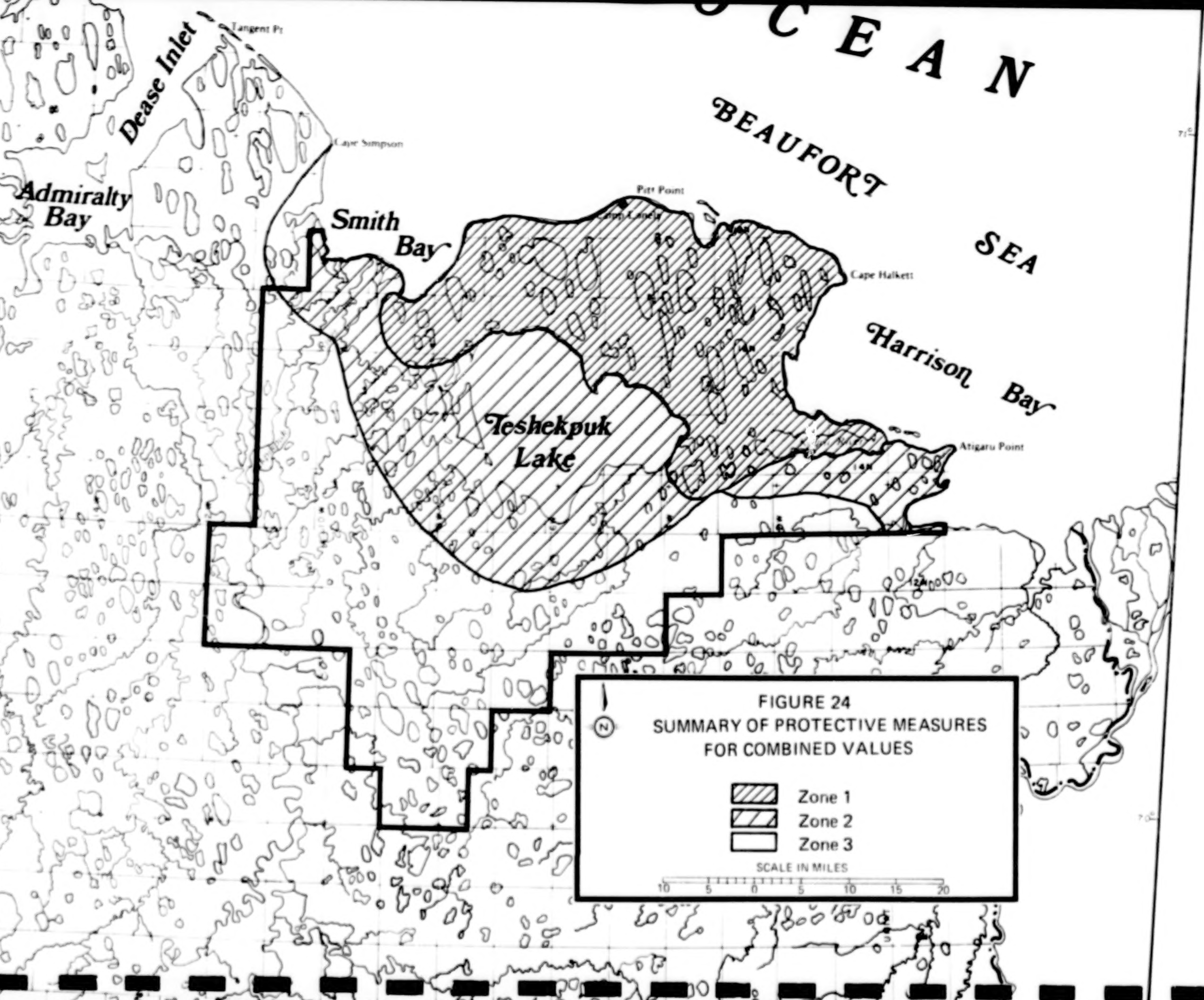


FIGURE 24
SUMMARY OF PROTECTIVE MEASURES
FOR COMBINED VALUES

▨ Zone 1
▨ Zone 2
☐ Zone 3

BEST COPY AVAILABLE

have greater impacts than during any other times when animals are more dispersed.

Portions of this zone are used, primarily by the residents of Barrow and secondarily by the residents of Nuiqsut and Atqasuk, for fishing, hunting and trapping. Subsistence fishing is the most important activity and uses are heaviest during the spring and summer months, but generally occur on a year-round basis.

Based on the sensitivity of black brant and other waterfowl species during molting and staging, and caribou during calving, allowing any activity that is not conducted according to the following protective measures, could result in impacts that could alter the present use of the area by waterfowl and other wildlife species. The following measures which would protect these crucial biological values would make oil and gas activities very difficult to conduct and/or preclude them as they are presently conducted on the North slope.

Protective Measures

1. All ground level activity would be restricted solely to October 1 thru April 30, except for Camp Lonely and authorized scientific studies.

2. Do not allow habitat alterations or disturbance including but not limited to dredging, filling and excavating. (Note: winter geophysical exploration, with appropriate stipulations and adequate snow cover, would not be considered surface disturbing).

3. No permanent facilities including but not limited to roads, pads, camps, airstrips, compressor stations, and pipelines would be allowed.

4. Require aircraft to avoid flying over the area or maintain an altitude of 5,000 ft. AGL from May 1 to September 30 and prohibit aircraft landings, except for Camp Lonely and authorized scientific studies. Flight corridors may have to be established to eliminate impacts to waterbirds.

5. Require aircraft to maintain an altitude of 1,000 ft. AGL from October 1 to April 30 (except for take off and landings).

6. Activities within 1/4 mile of, or within aquatic habitats, such as streams, lakes, estuarine and marine, which support a subsistence fishery (Figure 19) would not be allowed unless the activity will not jeopardize the continued existence of resource populations, aquatic habitats or jeopardize subsistence uses and needs..

7. The "Water Quality Standards" of the State of Alaska as approved by the Environmental Protection Agency would be maintained in all aquatic habitats such as streams, lakes, estuarine and marine habitats, within the TLSA.

8. No land exchanges within the TLSA should be allowed and BLM should attempt to acquire the Cape Halkett lands within Zone 1 so land management can be provided to a continuous block of land which has crucial biological and subsistence values.

9. No use of the area by domestic animals would be allowed.

10. No restrictions should be placed on ingress and egress to subsistence use areas, including but not limited to hunting, fishing and trapping.

11. Subsistence lifestyle stipulation (Appendix II) would be applied to all areas were subsistence lifestyle uses, as outlined in the subsistence section (Chapter 2), occur.

12. Special Management Zone stipulation (Appendix II) would apply to Zone 1.

B. Zone 2 - Figure 24

This zone includes high density habitats used by geese, ducks, and swans for nesting, molting, and staging, high subsistence use areas and caribou insect relief areas which falls outside of Zone 1.

Exploration could occur with little or no disturbance to waterfowl, but the same is not true of development. Leasing essentially guarantees development if there is a discovery. Development as we know it today will disturb waterfowl, caribou and subsistence uses because permanent facilities and year-round activities are necessary in a developing and/or producing field. Should both high national interest in leasing and development, and high potential for discovery of oil and gas be enough to warrant leasing within Zone 2, the following protective measures would be necessary to minimize disturbance of biological values and subsistence uses. If activities within Zone 2 are conducted according to the listed protective measures there could still be some impacts and losses of fish and wildlife resources and subsistence uses. However, these losses can be minimized and the character of the area will not be drastically altered if the protective measures are strictly adhered to. Any change or modification of the protective measures that would result in a reduced level of protection could cause significant impacts to the biological values and subsistence uses present. Further analysis of development design, biological values, and protective measures will be conducted in a development EIS if development ensues.

Protective Measures

1. Fill or excavation, including gravel extraction, would be limited to Class I wetlands and upland habitats. No fill or excavation would be allowed within Class II-VIII wetlands.

2. Construction of roads, pads, pipelines, facilities, etc. would be limited to October 1 thru April 30. Routine maintenance, production and transportation will be allowed year round.

3. Local service roads and utility corridors could be permitted, but no regional transportation or utility corridors would be allowed.

4. Unless environmentally preferable, prohibit permanent airstrips or heliports.

5. Permit only temporary roads or facilities during the exploratory phase.

6. Facilities essential to the production and transportation of oil from Zone 2 will be permitted in class I wetlands and upland habitats. Facilities will not be permitted in class II - VIII wetlands unless no other reasonable alternative exists. Unless deemed essential, facilities with a high level of disturbance or pollution risk would not be permitted.

7. The natural drainage patterns will be identified prior to, and maintained during, the construction of roads, pipelines, pads and other facilities. Culverts, bridges and other such drainage structures will be installed where needed to maintain natural drainage patterns. Where natural drainage patterns have been altered by facility placement, retrofitting within one season to correct drainage problems will be required.

8. Require aircraft to maintain an altitude of 5,000 ft. AGL during the period May 1 to September 30. Flight corridors may have to be established to minimize impacts to waterbirds.

9. Require aircraft to maintain an altitude of 1,000 ft. AGL from October 1 to April 30 (except for take off and landings).

10. Activities within 1/4 mile of, or within aquatic habitats, such as streams, lakes, estuarine and marine, which support a subsistence fishery (Figure 19) would not be allowed unless the activity will not jeopardize the continued existence of resource populations, aquatic habitats or jeopardize subsistence uses and needs.

11. Activities would not be allowed within 1/4 mile of Teshekpuk Lake, or within the lake itself, during periods of thaw (April 15 to October 15). No material would be discharged into the Lake at any time.

12. The "Water Quality Standards" of the State of Alaska as approved by the Environmental Protection Agency should be maintained in all aquatic habitats such as streams, lakes, estuarine and marine, within the TLSA.

13. No restrictions should be placed on ingress and egress to subsistence use areas, including but not limited to hunting, fishing and trapping.

14. Subsistence lifestyle stipulation (Appendix II) would be applied to all areas were subsistence lifestyle uses, as outlined in the subsistence section (Chapter 2), occur.

15. Special Management Zone stipulation (Appendix II) would apply to Zone 2.

C. Zone 3 - Figure 24

This zone constitutes the remainder of TLSA. Although biological and subsistence values are still important within Zone 3, the following protective measures would help minimize disturbance to the biological and subsistence values within the area.

Protective Measures

1. Fill or excavation for siting of facilities could be allowed in Class I wetlands and upland habitats. No fill or excavation within Class II-VIII wetlands should be allowed if reasonable alternatives exist outside of these areas.

2. Construction of roads, pads and facilities should be accomplished between October 1 and April 30 when feasible. Routine maintenance, production and transportation would be allowed year-round.

3. Permit only temporary roads or facilities during the exploratory phase.

4. The natural drainage patterns will be identified prior to, and maintained during, the construction of roads, pipelines, pads and other facilities. Culverts, bridges and other such drainage structures will be installed where needed to maintain natural drainage patterns. Where natural drainage patterns have been altered by facility placement, retrofitting within one season to correct drainage problems will be required.

5. Activities within 1/4 mile of, or within aquatic habitats, such as streams, lakes, estuarine and marine, which support a subsistence fishery (Figure 19) would not be allowed unless the activity will not jeopardize the continued existence of resource populations, aquatic habitats or jeopardize subsistence uses and needs..

6. The "Water Quality Standards" of the State of Alaska as approved by the Environmental Protection Agency shall be maintained in all aquatic habitats such as streams, lakes, estuarine and marine, within the TLSA.

7. Require aircraft to maintain an altitude of 5,000 ft. AGL during the period May 1 to September 30. Flight corridors may have to be established to minimize impacts to waterbirds.

8. Require aircraft to maintain an altitude of 1,000 ft. AGL from October 1 to April 30 (except for take off and landings).

9. No restrictions should be placed on ingress and egress to subsistence use areas, including but not limited to hunting, fishing and trapping.

10. Subsistence lifestyle stipulation (Appendix II) would be applied to all areas were subsistence lifestyle uses, as outlined in the subsistence section (Chapter 2), occur.

11. All of the BLM's existing biological and cultural lease terms and conditions (Appendix II) should apply to Zone 3.

III. STUDY NEEDS

Because of the potential conflicts between surface and subsurface values, the following studies would help improved future management of the TLSA:

A. Initiate a study on the feeding energetics of black brant during molting and staging to determine impacts associated with petroleum and other development activities.

B. Initiate a study to develop a detailed wetland habitat classification of the TLSA. This would allow placement of facilities such as roads, pipeline, camps and airstrips on habitats of less biological value.

C. A study on seismic activities (both vibroseis and explosive) as they relate to fisheries would help remove controversy on seismic activity on ice-covered lake and river areas.

D. Continue the present caribou radio-collaring project and conduct aerial photo census of the TH every two years in cooperation with Alaska Department of Fish and Game to gather baseline data to:

1. determine harvest levels for subsistence and sport hunting;

2. refine site specific information such as calving areas, insect relief areas, migration routes and wintering areas; and

3. gather pre-development baseline data needed to assess future impacts of petroleum development on the Teshekpuk Caribou Herd.

E. Develop a long-term study (Five to ten years) on the relationships between the TH, CAH and WAH. In addition, a public education program in the communities on the North Slope should be initiated to improve local knowledge of caribou research activities and management practices.

F. Develop a fisheries study on Teshekpuk Lake, Ikpikpuk/Chipp, Topagoruk and Meade Rivers to determine baseline population data for future analysis of impacts. Data that is specifically needed is species availability, behavior and harvest figures. An additional study on safe drilling practices on Teshekpuk Lake and other large lakes combined with a fisheries study is recommended prior to allowing drilling within 1/4 mile of or within these water bodies. Until then these lakes will be protected by the subsistence fisheries lease stipulation.

F. Initiate study on Qalluvik site, for potential listing in the National register of historic places.

BLANK PAGE

CHAPTER 4

SCOPING AND DATA GATHERING PROCESS

The Teshekpuk Lake Special Area Study scoping process began in early 1984 when the first scoping document was distributed for public comment on February 15, 1984. This document outlined the initial goals and objectives of TSAS, and solicited comments on what issues and resource values should be addressed in the study. After reviewing the public's comments on the preliminary scoping document, a list of issues and resource values that would be addressed in TSAS was developed. In addition, a schedule for the completion of the Teshekpuk Lake Special Area Study was prepared.

A final scoping document was distributed on July 1, 1984 for public review. This document contained the list of issues and resource values developed through public comments on the preliminary scoping document and outlined the schedule for the preparation of the TSAS.

Since initiating the scoping effort in 1984, there have been numerous meetings between participants (Appendix I) to help gather and analyze biological and subsistence data within the Teshekpuk Lake Special Area. In addition, several public meeting have been held to solicit public comments on the issues and resource values of the Teshekpuk Lake Special Area.

The following is a list of public meetings and workshops and Habitat Evaluation data gather meetings held to solicit comments about the Teshekpuk Special Area Study

I. PUBLIC MEETINGS AND WORKSHOPS

Place	Time	Purpose
Point Hope	Oct. 17 - 18, 1984	North Slope Borough Fish and Game Management Committee Meeting
Anchorage	Oct. 26, 1984	Teshekpuk Lake Special Area Study review. (Phase II and III participants.
Fairbanks	Nov. 15, 1984	BLM Advisory Council Meeting
Barrow	Dec. 12, 1984	Eastern and Western Arctic Fish and Game Advisory Board

Place	Time	Purpose
Barrow	Dec. 14, 1984	Fish and Game Management Committee of the North Slope Borough
Atqasuk	Jan. 7, 1985	Public Meeting
Barrow	Jan. 9, 1985	NSB Mayor and staff review of TSAS
Nuiqsut	Jan. 25, 1985	Public Meeting
Anchorage	Feb. 19, 1985	Teshekpuk Lake Special Area Study review. (Phase II and III participants.
Nome	Feb. 28, 1985	Arctic Regional Fish and Game Advisory Council Meeting
Fairbanks	March 4, 1985	Public Workshop
Anchorage	March 5, 1985	Public Workshop
Barrow	March 13 - 14, 1985	Public Workshop
Barrow	June 11, 1985	Public Workshop hosted by City of Barrow to comment on the draft Habitat and Mineral Evaluations
Barrow	June 27, 1985	Public Workshop hosted by City of Barrow to comment on the draft Habitat and Mineral Evaluations
Barrow	August 27, 1985	Fish and Game Management Committee of the North Slope Borough
Anchorage	September 10, 1985	Teshekpuk Lake Special Study review ((Phase 2 and 3 participants).
Anchorage	October 23, 1985	Public Forum to comment on Teshekpuk Lake Special Area Study recommendations and alternatives.

Place	Time	Purpose
Anchorage	October 24, 1985	Agency Heads (NSB, State and FWS) consult with BLM State Director

II. HABITAT EVALUATION MEETINGS

Place	Time	Purpose
Fairbanks	Aug. 30, 1984	Waterbird, caribou and subsistence data gathering
Fairbanks	Sept. 25, 1984	Caribou data gathering
Fairbanks	Nov. 9, 1984	Subsistence data gathering
Fairbanks	Nov. 16, 1984	Subsistence data gathering
Anchorage	Nov. 19, 1984	Waterbird data gathering
Anchorage	Dec. 21, 1984	Waterbird data gathering
Atqasuk	Jan. 8, 1985	Subsistence data gathering (Individual interviews)
Nuiqsut	Jan. 26, 1985	Subsistence data gathering (Individual interviews)
Barrow	Feb. 9 - 25, 1985	Subsistence data gathering (Individual interviews)
Fairbanks	Feb. 26, 1985	Waterbird, caribou and subsistence data gathering
Anchorage	March 26, 1985	Waterbird data gathering
Anchorage	April 12, 1985	Waterbird data gathering

BLANK PAGE

CHAPTER 5

COMMENTS ON THE DRAFT HABITAT EVALUATION

I. INDIVIDUALS, ORGANIZATIONS, GROUPS AND GOVERNMENT AGENCIES (FEDERAL, STATE AND LOCAL) WHO COMMENTED ON THE DRAFT HABITAT EVALUATION

A. Federal, State and Local Government Agencies

1. Bureau of Land Management
    - Fairbanks District (290 & 230)
    - Alaska State Office (930 & 934)
    - Washington Office
2. U.S. Fish and Wildlife Service
3. State of Alaska
    - Department of Transportation
    - Governmental Coordination Office
4. North Slope Borough
5. City of Barrow

B. Organizations and Groups

1. Alaska Oil and Gas Association
2. Arco Alaska Oil Company
3. Arctic Audubon Society
4. California Waterfowl Association
5. Exxon Oil Company
6. National Audubon Society
7. Northcoast Waterfowlers Association
8. Northern Alaska Environmental Center
9. Sohio Oil Company
10. Texaco Oil Company
11. The Wilderness Society

C. Individuals

1. Margaret Cowan
2. Richard J. Gordon

II. GENERIC COMMENTS

The following generic comments were developed by combining the major individual comments that were received during the draft review process, and are not attributed to any specific individual or organization. A complete list of all comments received are presented in Appendix V.

A.

Comment:

Is BLM committed to oil and gas leasing in all or portions of the Teshekpuk Lake Special Area?

Answer:

The BLM is required by PL 96-514 to manage an expeditious oil and gas leasing program within NPR-A, while protecting the surface resource values. The Teshekpuk Lake Special Area Study was designed to help identify important habitat areas and surface values where special protection is needed. In addition, criteria were developed to protect surface values if oil and gas leasing and or other activities were to occur. To date, the BLM has made no recommendations or decisions on any future oil and gas leasing within the TLSA. This Habitat Evaluation and the separate Mineral Evaluation is only Phase 1 of the Teshekpuk Lake Special Area Study and recommendations and decisions concerning oil and gas leasing and other activities will not be made until Phases 2 and 3 in September and October, 1985, respectively.

B.

Comment:

Why weren't recommendations for areas of no leasing identified in the Habitat Evaluation to protect wildlife values?

Answer:

The Habitat Evaluation was designed to update and illustrate surface resource values and develop criteria to help protect those values. The Habitat Evaluation was not prepared to develop management recommendations or alternatives. Recommendations for leasing and specific stipulations for protecting wildlife resources if leasing or other activities were to occur, will be developed during Phase 2 of the Teshekpuk Lake Special Area Study.

C.

Comment:

Many of the criteria developed to protect surface values within Zone 1 and Zone 2 are too restrictive and would preclude oil and gas development within the area.

Answer:

After reviewing the available literature and data concerning potential impacts associated with oil and gas and other activities, criteria as outlined in Chapter Three, were developed to help protect this unique ecosystem. Because of the significance and sensitivity of Zone 1 and 2 values, including black brant molting and staging, the nesting, molting and staging of other geese, ducks, swans and shorebirds, and caribou calving, relatively strong criteria are necessary if these values are to be protected. This concern for the incompatibility of oil and gas development and proposed protection criteria within Zones 1 and 2 (particularly Zone 1) will be taken into consideration in Phase 2. During this recommendation phase, managers will weigh the feasibility of leasing with strict protections (deemed advisable from our present biological knowledge and petroleum development technology) versus not offering these areas for lease.

D.

Comment:

Surface protection criteria developed for the TLSA would adversely affect already existing oil and gas lease tracts.

Answer:

Everything will be done to allow for the orderly development of the existing lease tracts while still protecting the surface values present. Lease stipulations applied to previously sold lease tracts (generally within Zone 3) will not change. Existing stipulations will provide protection during exploration. Should development occur, additional information gained through present and future studies will help prepare environmentally sound designs for a environmental impact statement on development.

E.

Comment:

We believe oil and gas activities are compatible with wildlife and their habitats within the TLSA. Have ROD conditions for removing the existing deletion area within TLSA been met?

Answer:

From a review of documents from industry, federal agencies, and public participants, there is presently no conclusive evidence that oil and gas activities are compatible with wildlife values within TLSA. Studies conducted within oil and gas areas (Kuparuk, Prudhoe and Lisburne) have shown that some animals are more tolerant and will adapt to certain conditions under certain circumstances. Studies have shown that nesting of geese and other birds does occur near oil and gas activities and that some caribou calving has occurred within the Prudhoe Bay area. However, the conditions that are present within TLSA (over 50,000 geese during the molting season) have never been subjected to extensive oil and gas activities and there is no evidence to suggest that this high concentration of birds would be as adaptable to the same conditions as a lower concentration of nesting birds would be. There is evidence that high densities of geese and caribou are more sensitive to disturbance. Also much higher risks are at stake by disturbing these larger concentrations of wildlife (geese of international and caribou of regional significance).

F.

Comment:

Has BLM considered all documents and information that were submitted by individuals, groups, and federal and State agencies?

Answer:

During the preparation of the Habitat Evaluation, all data (orally or written) that were available from all sources were taken into consideration for evaluating the surface resource values. As shown in Chapter 4, there were numerous meetings, workshops and interviews conducted to help gather information relevant to the Teshekpuk Lake area. In addition, the articles that were utilized in developing the Habitat Evaluation are listed in the Literature Cited section. As new data becomes available through additional surveys and studies, it will be evaluated and incorporated into future management decisions within the area.

G.

Comment:

Why were the laws, regulations and congressional bills that have dealt with the Teshekpuk Lake Special Area and NPR-A not discussed in detail within the Habitat Evaluation?

Answer:

The Habitat Evaluation is a gathering and analysis process for biological and subsistence data, and is designed to bring together all of the available information on the surface values within the area. The laws, regulations and policy dealing with the management of the area will be considered by the Phase 2 multiple agency managers, who are tasked with developing recommendations for the Teshekpuk Lake Special Area.

H.

Comment:

What specific actions will be taken if the Federal Aviation Administration (FAA) does not adopt flight restrictions over the area?

Answer:

The Habitat Evaluation has discussed the potential impacts of aircraft disturbance on waterfowl and caribou, and has identified specific criteria which would help alleviate these potential impacts. Similar criteria are now being used in the permitting process for operations conducted within NPR-A in general and TLSA in particular. The BLM has used flight altitude restrictions within its permitting process for many years. The BLM does not restrict casual use (individual planes flying through the area) which does not require a permit, and presently is not requesting an official FAA control of the area. If in the future it appears that casual-use aircraft traffic is having effects on the species present, then the BLM could request an official FAA control of the area. BLM would like to obtain more definitive information about aircraft disturbance of black brant and caribou prior to requesting FAA to establish a special conservation or restricted area for the Point Barrow sectional aeronautical chart.

I.

Comment:

What were the criteria used to develop the three Zones?

Answer:

In analyzing the available data gathered from all sources, the development of the three zones was based on the overall wildlife and subsistence values within the area, and the sensitivity to impacts of the wildlife species present. Zone 1 is of particularly high international, national, State and local significance due to the concentrations of waterbirds (particularly geese) and caribou. It is the most sensitive zone within TLSA due to the large concentrations of molting geese (up to 58,000 in 1984) and because the majority of the Teshekpuk Lake caribou herd calves are within this zone. Up to 20% of the world's declining population of Pacific black brant use this largest known molting resort on the arctic coast of North America and Siberia for the nonbreeding portion of the population. Zone 2 contains important habitats used by geese, ducks and swans for nesting, molting and staging, high subsistence use areas (Teshekpuk Lake) and caribou insect relief areas. Zone 2 is an important area but does not have as high a concentration of molting geese (high national and international significance) or caribou calving (high local and State significance) as found in Zone 1. The remainder of the area is designated as Zone 3, which contains valuable fish and wildlife habitats and subsistence use areas, but not significantly higher than are found in the adjacent Arctic Coastal Plain.

J.

Comment:

Are fisheries resources adequately protected? Why is Teshekpuk Lake within Zone 2 and not Zone 1?

Answer:

Unlike the goose molting area or caribou calving area which can be identified within a zone, fisheries within the TLSA occur generally over the entire area and will not fit easily into any one zone. Teshekpuk Lake as well as many other lakes and streams (Appendix VI, Map 4) which have been identified as an important fishery will be protected by the fisheries criteria (no drilling within 1/4 mile) no matter which of the three zones they were to occur in. Fisheries are an important resource of the area, as shown by public comments (Appendix V), and are used by people of the area for subsistence activities.

K.

Comment:

Why are other species not given as thorough a discussion as black brant, caribou and fish?

Answer:

During the scoping phase of the Teshekpuk Special Area Study, BLM staff reaffirmed that black brant and caribou were sensitive species and that their international and national (black brant) and local (caribou) significance made them the most important species. These species were also noted as important species by the ROD on oil and gas leasing and development in NPR-A (BLM 1983b) While BLM is not species-specific for fish, they are very important for subsistence purposes and are considered within the subsistence section. Other species are valuable to the ecosystem as a whole and are considered in this sense, but priority has been given to black brant, caribou and subsistence uses.

L.

Comment:

Should not all black brant molting habitats be closed to oil and gas leasing? Would opening any of these areas be inconsistent with the ROD for oil and gas leasing in NPR-A?

Answer:

The intent of the Habitat Evaluation was to delineate high density black brant use areas (molting, staging and nesting), and develop criteria to protect those areas. The determination of what areas should be opened or closed to oil and gas leasing is a management decision and will be developed in Phases 2 and 3 through the analysis of data from the Phase 1 evaluations. We are attempting to evaluate the crucial black brant molting areas in preparation for recommending protection in Phase 2. This effort is consistent with the intent to protect black brant habitat in the EIS and ROD on oil and gas leasing and development in NPR-A. The ROD deleted 217,000 acres and designated another 751,000 acres surrounding the deletion as a Special Management Zone in which a design solution stipulation applies. The Habitat Evaluation maintains consistency with the intent of this protection while analyzing all new and presently available black brant data on habitat, behavior and population health to provide for an informed decision.

M.

Comment:

How were crucial habitats determined?

Answer:

The crucial habitats within the TLSA were identified through determination of those areas with highly valued wildlife species whose disturbance would likely cause significant deleterious impacts. The goose molting and staging area (Zone 1) is considered crucial habitat due to the high concentrations of birds (over 58,000 molting geese in 1984), which are very susceptible to disturbance during the molting and staging periods. The calving area northeast of Teshekpuk Lake and insect relief areas are caribou crucial habitats. During the calving and insect relief time periods caribou are very concentrated and are more easily disturbed.

N.

Comment:

Why are cited references in the waterbird section of the HE not given a complete specific detailed analysis.

Answer:

In developing the Habitat Evaluation, the BLM was attempting to provide a general synthesis of the available data, values and sensitivities pertaining to TLSA. A reasonable document length does not allow for a detailed analysis for each species, but does provide a general synthesis of all data and reference material that supports the synthesis and could provide additional specific information should an interested party desire more detail. The Literature Cited section provides a list of the available information the BLM used in developing this HE.

O.

Comment:

Are oil and gas development activities possible within Zones 1 and 2 of TLSA without affecting the biological values and subsistence uses?

Answer:

The NPR-A Caribou/Waterbird Analysis Workshop (Gilliam and Lent 1982), and the Phase 1 Waterbird Working Group (Appendix I) do not believe that it is possible to develop an oil field in the northern portion of TLSA and still maintain the present waterbird values.

The City of Barrow sponsored two town meetings to discuss the possibility of oil and gas development within TLSA. The overall conclusion of the people testifying was that they opposed oil development within TLSA because of the potential for impacts on subsistences uses.

The Alaska Oil and Gas Association and other individual companies feel that wildlife and oil and gas activities are compatible and that the present stipulations that are being used in NPR-A are adequate.

Due to these and other conflicting opinions, the BLM prepared this Habitat Evaluation in an attempt to identify important biological values and subsistence uses and criteria that would help minimize impacts on these surface values if oil and gas development was to occur.

P.

Comment:

Were the lines delineating biological values (Appendix VI, Map 2) and the deletion recommendation (Figure 25), as submitted by the Phase 1 Waterbird Working Group, used in developing the three zones in figure 24?

Answer:

All of the biological lines as delineated on Map 2 of Appendix VI were used in developing the three zones in figure 24. The line that delineates an area to be deleted from leasing (Figure 25) is a management line drawn along township lines and does not delineate a biological population, so consequently was not used in this Habitat Evaluation. This line could be utilized by management in Phase 2, but it is not appropriate to use it in a biological evaluation.

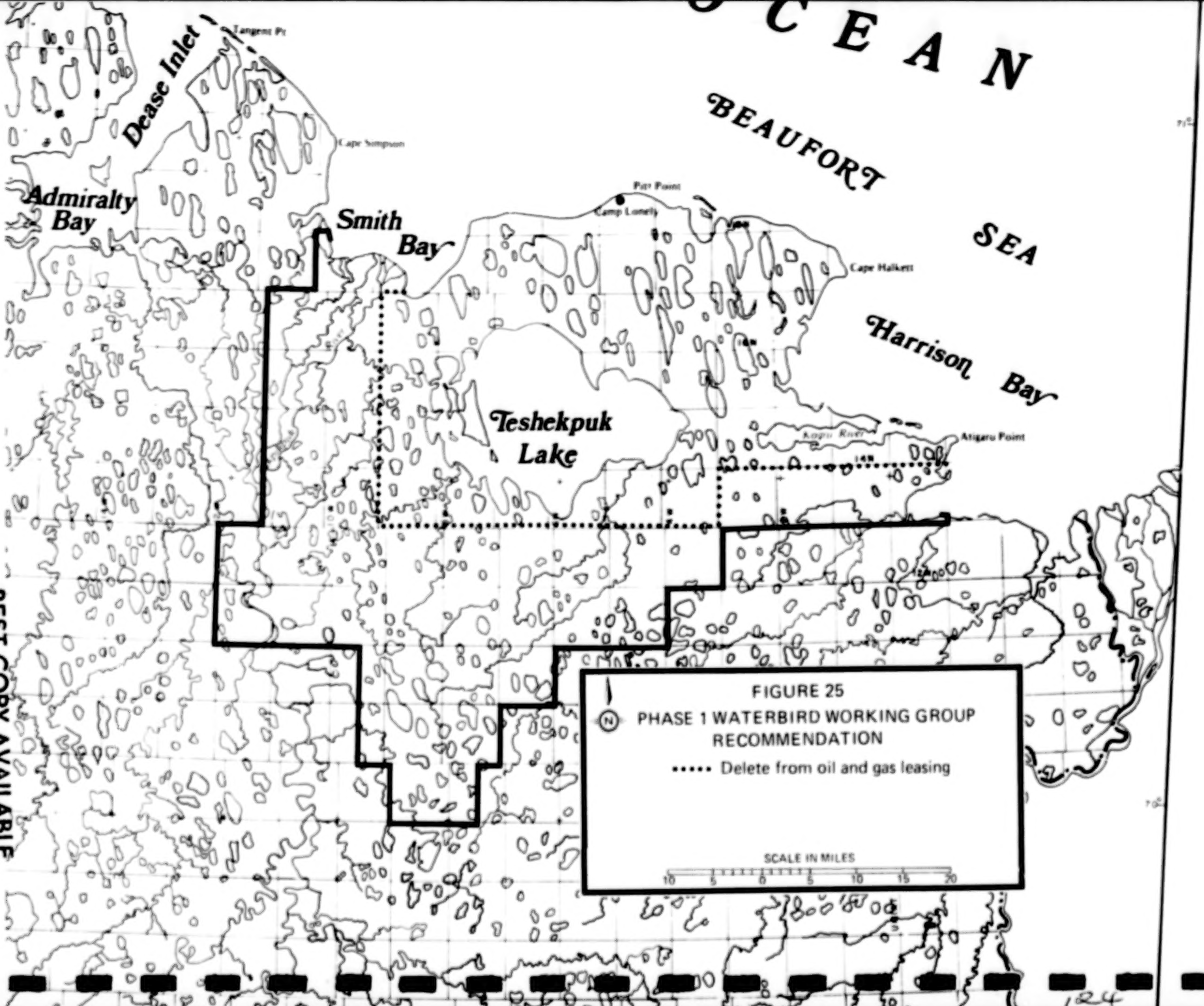


FIGURE 25
PHASE 1 WATERBIRD WORKING GROUP RECOMMENDATION

LITERATURE CITED

Abele, G., D. A. Walker, J. Brown, M. L. Brewer, and D. M. Atwood. 1978. Effects of low-ground pressure vehicle traffic on tundra at Lonely, Alaska. U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, NH. CRREL Special Rep. No 78-16. 63pp.

Anderson, R. M. 1919. Report on the natural history collections of the expedition. Pages 436-527 *in* Stefansson, V. My life with the Eskimos. MacMillan, New York, NY. 538pp. (cited from Derksen et al. 1979b).

Arctic Environmental Information and Data Center. 1979. Paisangitch: A cultural plan for the village of Nuiqsut, 1979.

Arundale, W. H., and W. S. Schneider. 1983. *Quliaqtuat Inupiat Nunaninnin* unpublished manuscript prepared for the Commission on History, Language and Culture, Barrow, Alaska.

Barry, T. W. 1966. The geese of the Anderson River Delta, Northwest Territories. Ph.D. Dissertation. Univ. of Alberta, Edmonton. 181pp. (cited from Bellrose 1976).

Barsdate, R. J., M. C. Miller, V. Alexander, J. R. Vestal, and J. E. Hobbie. 1980. Oil spill effects. *in* Hobbie, J. E. ed. Limnology of tundra ponds: Barrow, Alaska. US/IBP Synthesis Series 13. Dowden, Hutchinson, and Ross, Inc. Stroudsburg, PA.

Bellrose, F. C. 1976. Ducks, geese, and swans of North America. Stackpole Books, Harrisburg, PA. 540pp.

Bendock, T., and J. Burr. 1984. Freshwater Fish Distributions in the Central Arctic Coastal Plain (Ikpikpuk River to Colville River).

Benning, D. S. 1984. Coordinated spring mid-continent white-fronted goose survey. mimeo. 9pp.

Bergman, R. D., and D. V. Derksen. 1977. Observations on Arctic and red-throated loons at Storkersen Point, Alaska. Arctic 30(1):41-51.

Bergman, R. D., R. L. Howard, K. F. Abraham, and M. W. Weller. 1977. Waterbirds and their wetland resources in relation to oil development at Storkersen Point, Alaska. U.S. Fish and Wildl. Serv. Resource Publ. No. 129. 38pp.

Brower, C. D. 1942.
Fifty years below zero. Dodd, Meade and Co., New York.

Burch, E. S., Jr. 1970.
The Eskimo Trading Partnership in North Alaska: A Study in "Balanced Reciprocity." Anthropological Papers of the University of Alaska 15(1): pp. 49-80.

_____. 1974.
Eskimo Warfare in Northwest Alaska. Anthropological Papers of the University of Alaska 16(2): pp. 1-14.

_____. 1975.
Eskimo Kinsmen. Changing family relationships in Northwest Alaska. American Ethnological Society Monograph No. 59. St. Paul: West Publishing Company.

_____. 1980.
Traditional Eskimo Societies in Northwest Alaska. Alaska Native Culture and History. Yoshinobu Kotani and William B. Workman, eds. National Museum of Ethnology, Suita, Osaka Japan (Senri Ethnological Studies No. 4).

_____. 1981.
The Traditional Eskimo Hunters of Point Hope, Alaska: 1800-1875. North Slope Borough, Barrow, Alaska.

_____, and T. C. Correll 1972.
Alliance and Conflict: Inter-regional Relations in North Alaska. in D. L. Guemple ed. Alliance in Eskimo Society. Proceedings of the American Ethnological Society, 1971, Supplement. Seattle: University of Washington Press, pp. 17-39.

BLM. 1983a.
Final environmental impact statement on oil and gas leasing in the National Petroleum Reserve in Alaska. Bur. Land Manage. Alaska State Off. Anchorage, AK. 154pp + appendices.

_____. 1983b.
Record of decision on oil and gas leasing and development in the National Petroleum Reserve in Alaska. Bur. Land Manage. Alaska State Off. Anchorage, AK. 20pp.

_____. 1984.
Notice of sale: oil and gas lease sale no. 841. Bur. Land Manage. Alaska State Off. Anchorage, AK.

Calef, G. W., E. A. Debock, and G. M. Lortie. 1976.
The reaction of Barren-Ground Caribou to aircraft. Arctic 29(4):201-212.

Cameron, R. D. 1983.
Issue: caribou and petroleum development in arctic Alaska. Arctic Vol. 36:227-231.

_____, and K. R. Whitten. 1979.
Influence of the Trans-Alaska Pipeline Corridor on the local distribution of caribou. in E. Reimers, E. Gaare and S. Skjenneberg, eds. Proceedings of the second International Reindeer/Caribou Symposium, Roros, Norway, 1979. Trondheim: Direktoratet for vilt og ferskvannsfisk. 475-484.

_____, _____, W. T. Smith, and D. D. Roby. 1979.
Caribou distribution and group composition associated with construction of the Trans-Alaska Pipeline. Can Field-Nat. 93(2):155-162

Carruthers, D. R. 1983.
Overlap of Central and Western Arctic Caribou within the current range of the Central Arctic Caribou Herd. Prepared for ARCO Alaska Inc. by Renewable Resources Consulting Services Ltd., Sidney, B.C. 20p.

_____, R. D. Jakimchuk, and S. H. Ferguson. 1984.
The relationship between the Central Arctic Caribou Herd and the Trans-Alaska Pipeline.

Curatolo, J. A., S. M. Murphy, and M. A. Robus. 1982.
Caribou responses to the pipeline/road complex in the Kuparuk Oil Field, Alaska, 1981. Final report prepared and funded by Arco Alaska, Inc., Anchorage, Alaska.

Davis, C. W., D. C. Link, K. M. Schoenberg, and H. M. Shields. 1981
Slogging, humping and mucking through the NPR-A. An archaeclogical interlude, Vols 2 & 3: Site reports. Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska, Fairbanks. Occasional Paper No. 25.

Davis J. L., and P. Valkenburg. 1979.
Caribou distribution, population characteristics, mortality, and response to disturbance in northwest Alaska. in P.C. Lent, ed. Studies of selected wildlife and fish and their habitat on and adjacent to the National Petroleum Reserve in Alaska (NPR-A), 1977-1978, Vol. 1: 13-52. Work Group 3, Field Study 3, U.S. Dept. of the Interior, Anchorage.

Davis, R. A. 1972.
A comparative study of the use of habitat by arctic loons and red-throated loons. Ph.D. Dissertation. Univ. of Western Ontario, London, Ontario, Canada. 290pp. (cited from Derksen et al. 1981).

Dease, P. W., and T. Simpson. 1838.
Account of the recent arctic discoveries by Messrs. Dease and Simpson with maps. Royal Geographical Society Journal, 8: pp. 213-225.

Derksen, D. V. 1978.
Summary of Teshekpuk Lake aerial goose surveys (1976-1978). Unpubl. Rep. U.S. Fish and Wildl. Serv. Office of Special Studies, Anchorage, AK. 20pp.

_____, W. D. Eldridge, and T. C. Rothe. 1979a.
Waterbird and wetland habitat studies. Pages 229-311 in NPR-A Work Group 3. Studies of selected wildlife and fish and their use of habitats on and adjacent to the National Petroleum Reserve in Alaska 1977-1978, Volume 2. U.S. Bur. of Land Manage. Alaska State Office, Anchorage, AK. 421pp.

_____, M. W. Weller, and W. D. Eldridge. 1979b.
Distributional ecology of geese molting near Teshekpuk Lake, National Petroleum Reserve-Alaska. Pages 189-207. in Jarvis, R.L., and J.C. Bartonek (eds.). Management and biology of Pacific Flyway geese. OSU Bookstores, Inc., Corvallis, OR. 346pp.

_____, and W.D. Eldridge. 1980.
Drought-displacement of pintails to the Arctic Coastal Plain, Alaska. J. Wildl. Manage. 44(1):224-229.

_____, T. C. Rothe, and W. D. Eldridge. 1981.
Use of wetland habitats by birds in the National Petroleum Reserve-Alaska. U.S. Fish and Wildl. Serv. Resource Publ. No. 141. 27pp.

_____, W. D. Eldridge, and M. W. Weller. 1982.
Habitat ecology of Pacific black brant and other geese moulting near Teshekpuk Lake, Alaska. Wildfowl 33: 39-57.

Eberhardt, L. E., W. C. Hanson, J. L. Bengtson, R. A. Garrott, and E. E. Hanson. 1982.
Arctic fox home range characteristics in an oil development area. J. Wildl. Manage. 46(1):183-190.

Einarsen, A. S. 1965.
Black brant, sea goose of the Pacific Coast. Univ. Washington Press, Seattle, WA. 142pp.

Gabrielson, I. N., and F. C. Lincoln. 1959.
The birds of Alaska. Stackpole Books, Harrisburg, PA. (cited from King 1970).

Gal, R. 1975.
Seasonal mazeways: Example from the Seward Peninsula. Paper presented at 2nd. annual meeting of the Alaska Anthropological Association, Fairbanks, Alaska.

_____. 1985.
A study of subsistence in the Teshekpuk Lake Special Area, unpublished open-file report in preparation.

Galginaitis, M., C. Clang, K. M. MacQueen, A. Dekin Jr., and D. Zipkin. 1984.
Ethnographic study and monitoring methodology of contemporary economic growth, socio-cultural change and community development in Nuiqsut, Alaska. Minerals Management Service, Alaska Outer Continental Shelf Region. Tech. Report No. 96.

Gilliam, J. K., and P. C. Lent, (eds.) 1982.
Proceedings of the National Petroleum Reserve in Alaska (NPR-A) caribou/waterbird impact analysis workshop. May 11-13, 1982. Anchorage, Alaska. (Final Report, November 1982) USDI, Bureau of Land Management, Alaska State Office, Anchorage, AK.

Gollop, M. A., and R. A. Davis. 1974.
Gas compressor noise simulator disturbance to snow geese, Komakuk Beach, Yukon Territory, September, 1972. Arctic Gas Biological Report Serie 14: 280-305.

_____, J. E. Black, B. E. Felske, and R. A. Davis. 1974a.
Disturbance studies of breeding black brant, common eiders, glaucous gulls and arctic terns at Nunaluk Spit and Philips Bay, Yukon Territory, July 1972. Pages 153-201 in Gunn, W.W., and J.A. Livingston. (eds.) Disturbance to birds by gas compressor noise simulators, aircraft, and human activity in the MacKenzie Valley and the North Slope, 1972. Arctic Gas Biol. Rep. Ser. Vol. 14. 304pp.

_____, J. A. Goldsberry, and R. A. Davis. 1974b.
Aircraft disturbance to moulting seaducks, Herschel Island, Yukon Territory, August 1972. Pages 202-232 in Gunn, W.W., and J.A. Livingston. (eds.) Disturbance to birds by gas compressor noise simulators, aircraft, and human activity in the MacKenzie Valley and the North Slope, 1972. Arctic Gas Biol. Rep. Ser. Vol. 14. 304pp.

Hablett, T. R. 1979.
Fish inventories conducted within the National Petroleum Reserve on the North Slope of Alaska, 1977-78. in P.C. Lent, ed. Studies of selected wildlife and fish and their habitat on and adjacent to the National Petroleum Reserve in Alaska (NPR-A), 1977-1978, Vol. 2: 337-423. Work Group 3, Field Study 3, U.S. Dept. of the Interior, Anchorage.

Haddock, J. L., and C. D. Evans. 1975.
Spring bird populations on Alaska's Arctic Slope. Unpubl. Rep. U.S. Fish and Wildl. Serv. Office of Special Studies, Anchorage, AK. 45pp.

Hall, E. S. Jr. 1983
A subsistence study of seven lease tracts in the National Petroleum Reserve in Alaska with special reference to the proposed Brontosaurus exploratory well site area. Edwin Hall and Associates technical memorandum #11.

Hansen, H. A. 1957.
Annual waterfowl report, Alaska. Unpubl. Rep. Bur. of Sport Fish. and Wildl. Juneau, AK. (cited from King 1970).

Hanson, W. C. 1981.
Caribou (Rangifer tarandus) encounters with pipelines in northern Alaska. Can. Field-Nat. 95(1):57-62.

Hawkins, L. 1983.
Tundra swan study: 1893 progress report. Unpubl. Rep. U.S. Fish and Wildl. Serv., Anchorage, AK. 6pp.

Higgs, E. S., and C. Vita-Finzi. 1972.
Prehistoric economics: a territorial approach. in Higgs, E. S. ed. Papers in economic prehistory, Cambridge University Press, Cambridge, U.K. pp. 27-36.

Hoffman, D., D. Libbey, and G. Spearman. 1978.
A study of land use values through time. Co-operative Park Studies Unit, Univ. of Alaska, Occasional Paper No. 12, Fairbanks.

Hopson, F. 1976.
Nuiqsut/Tasikpak traditional land use inventory. unpublished data, North Slope Borough Inupiat Office.

_____. 1977.
Barrow-Atkasook area traditional land use inventory. unpublished data, North Slope Borough Inupiat Office.

Jeffery, M. I. 1982.
Public Participation Along Alaska's Coast: Reaching Out to the Villages. Paper presented at the Alaska Symposium on the Social, Economic and Cultural Impacts of Natural Resource Development. Anchorage. August 25-27. ms. 21 pp.

Johnson, H. J., D. E. Timm, and P. F. Springer. 1979.
Morphological characteristics of Canada geese in the Pacific Flyway. Pages 56-80 in Jarvis, R.L., and J.C. Bartonek (eds.). Management and biology of Pacific Flyway geese. OSU Bookstores, Inc., Corvallis, OR. 346pp.

Johnson, S. R., D. M. Troy, and J. G. Cole. 1985.
The Status of Snow Geese in the Endicott Development Unit, Sagavanirktok River Delta, Alaska: A 5-Year Summary Report. Sohio Alaska Petroleum Company.

Jones, S. G. 1980.
Abundance and habitat selection of shorebirds at Prudhoe Bay, Alaska. M.S. Thesis. Brigham Young Univ., Provo, UT. 49pp.

King, J. G. 1970.
The swans and geese of Alaska's Arctic Slope. Wildfowl 21: 11-17.

_____, and J. I. Hodges. 1979.
A preliminary analysis of goose banding on Alaska's Arctic Slope. Pages 176-188 in Jarvis, R.L., and J.C. Bartonek (eds.). Management and biology of Pacific Flyway geese. OSU Bookstores, Inc., Corvallis, OR. 346pp.

King, R. 1979.
Results of aerial surveys of migratory birds on NPR-A in 1977 and 1978. Pages 187-226 in NPR-A Work Group 3. Studies of selected wildlife and fish and their use of habitats on and adjacent to the National Petroleum Reserve in Alaska 1977-1978, Volume 2. U.S. Bur. of Land Manage. Alaska State Office, Anchorage, AK. 421pp.

_____. 1984.
Results of the 1982 and 1983 aerial goose surveys at Teshekpuk Lake, Alaska. Unpubl. Rep. U.S. Fish and Wildl. Serv. Migratory Bird Management-North, Fairbanks, AK. 10pp.

Klein D. R. 1979.
Reaction of caribou and reindeer to obstructions a reassessment. in E. Reimers, E. Gaare and S. Skjenneberg, eds. Proceedings of the second International Reindeer/Caribou Symposium, Roros, Norway, 1979. Trondheim: Direktoratet for vilt og ferskvannsfisk. 519-527.

Klerekoper, F. G. 1977.
Diary of Fred G. Klerekoper. Dogsled trip from Barrow to Demarcation Point, April 1937. North Slope Borough Commission on History and Culture, Barrow.

Kramer, G. W., L. R. Rauen, and S. W. Harris. 1979.
Populations, hunting mortality, and habitat use of black brant at San Quinten Bay, Baja California, Mexico. Pages 242-254 in Jarvis, R. L. and J. C. Bartonek (eds.) Management and biology of Pacific Flyway geese. OSU Bookstores, Inc., Corvallis, OR. 346pp.

Laughlin, W. S. 1972
Hunting: An intergrading bio behavior system and its evolutionary importance. in Lee, R. D. and I. DeVore (eds.) Man the Hunter.

Lawhead, B. E. 1984.
Summer movements of caribou in the Western Kuparuk Oilfield, Alaska, 1984. Prepared for ARCO Alaska, Inc.

_____, and J. A. Curatolo. 1984.
Distribution and movements of the Central Arctic Caribou Herd, summer 1983.

Lehnhausen, W. A., and S. E. Quinlan. 1981.
Bird migration and habitat use at Icy Cape, Alaska. Unpubl. Rep. U. S. Fish and Wildl. Serv., Anchorage, AK. 298pp.

Maclean, E. 1971.
Genealogical record of Barrow eskimo families. Unpublished data, Inupiat Office, Barrow.

McCourt, K. H., J. D. Feist, D. Doll, and J. J. Russell. 1974.
Disturbance studies of caribou and other mammals in the Yukon and Alaska, 1972. Arctic Gas Biological Report Series, Vol. 5.

Mellor, J. C. 1982.
Bathymetry of Alaskan Arctic Lakes: A Key to Resource Inventory with Remote-Sensing Methods.

Mickelson, P. G. 1975.
Breeding biology of cackling geese and associated species on the Yukon-Kuskokwim Delta, Alaska. Wildl. Monogr. 45:1-35.

Miller, F. L., C. J. Jonkel and G. D. Tessier. No date.
Group cohesion and leadership response by Barren-Ground Caribou to man-made barriers.

_____, and A. Gunn. 1979.
Responses of Peary Caribou and muskoxen to helicopter harassment. Occasional Paper No. 40 Canadian Wildlife Service.

Murphy, S. M. 1984.
Caribou use of ramps for crossing pipe/road complexes, Kuparuk Oilfield, Alaska, 1984. Prepared for ARCO Alaska, Inc.

North Slope Borough. 1977.
Diary of Fred G. Klerekoper: Dogsled trip from Barrow to Demarcation Point, April 1937.

_____. 1980.
Qiniqtuagaksrat Utuqqanaat Inuuniagninisiqun, Commission of History and Culture, North Slope Borough, Barrow, Alaska.

NPR-A Task Force. 1979.
105(c) final study-volume 1: summaries of values and resource analysis and land use options (excluding petroleum values and uses). U.S. Bur. of Land Manage. Alaska State Office, Anchorage, AK. 260pp.

Owens, N. W. 1977.
Responses of wintering brent geese to human disturbance. Wildfowl 28:5-14.

Pacific Waterfowl Flyway Council. 1980.
Wrangel Island snow goose Pacific Flyway management plan. mimeo. 24pp.

_____. 1981.
Management Plan-Pacific Coast brant. mimeo. 75pp.

Parsons, T. 1966.
Societies: Evolutionary and Comparative Perspectives. Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

Pedersen, S. 1979.
Biotic resources of the North Slope Inupiat. Native livelihood and Dependence. Prepared by North Slope Borough Contract Staff. pp. 99-16. U.S. Department of Interior, National Petroleum Reserve in Alaska 105(c) Land Use Study, Anchorage.

Pitelka, F. A. 1974.
An avifaunal review for the Barrow region and North Slope of arctic Alaska. Arct. and Alp. Res. 6(2):161-184.

Ray, D. J. 1964.
Nineteenth century settlement and subsistence patterns in Bering Strait. Arctic Anthropology II(2): 61-94.

Research Foundation of State University of New York - Binghamton. 1984.
Ethnographic Study and Monitoring Methodology of Contemporary Economic Growth, Sociocultural Change and Community Development in Nuiqsut, Alaska. Technical Report Number 96. Minerals Management Service, Alaska Outer Continental Shelf Region. Anchorage.

Reynolds, P. 1982.
Preliminary report on the status of the Teshekpuk Caribou Herd. Unpublished report to USDI, Bureau of Land Management, Fairbanks District Office, Fairbanks, AK.

Salter, R., and R. A. Davis. 1974.
Snow geese disturbance by aircraft on the North Slope, September, 1972. Pages 258-279 in Gunn, W.W., and J.A. Livingston. (eds.) Disturbance to birds by gas compressor noise simulators, aircraft, and human activity in the MacKenzie Valley and the North Slope, 1972. Arctic Gas Biol. Rep. Ser. Vol. 14. 304pp.

Schneider, W. S., S. Pedersen, and D. Libbey. 1980.
Barrow-Atqasuk: land use values through time in the Barrow-Atqasuk areas. Occasional Paper 24, Anthropology and Historic Preservation, Cooperative Park Studies Unit and North Slope Borough. University of Alaska, Fairbanks.

Schroeder, R. L. 1984.
Habitat suitability index models: black brant. US Fish and Wildl. Serv. FWS/OBS-82/10.63.. 11pp.

Schweinburg, R. 1974.
Disturbance effects of aircraft to waterfowl on North Slope lakes, June 1972. Pages 1-49 in Gunn, W.W., and J.A. Livingston. (eds.) Disturbance to birds by gas compressor noise simulators, aircraft, and human activity in the MacKenzie Valley and the North Slope, 1972. Arctic Gas Biol. Rep. Ser. Vol. 14. 304pp.

_____, M. A. Gollop, and R. A. Davis. 1974.
Preliminary waterfowl disturbance studies, MacKenzie Valley, August 1972. Pages 232-256 in Gunn, W.W., and J.A. Livingston. (eds.) Disturbance to birds by gas compressor noise simulators, aircraft, and human activity in the MacKenzie Valley and the North Slope, 1972. Arctic Gas Biol. Rep. Ser. Vol. 14. 304pp.

Selkregg, L. L. 1975.
Alaska Regional Profiles, Arctic Region. State of Alaska, Univ. of Alaska, Arctic Environmental and Data Center.

Sellman, P. V., J. Brown, R. I. Lewellen, H. Mckim, and C. Merry 1975.
The classification and geomorphic implications of thaw lakes on the Arctic Coastal Plain, Alaska. CRREL Rep. No. 344. Hanover, NH. (cited from Derksen et al. 1982).

Shepard, S., K. Bennett, and J. K. Gilliam. 1982.
An analysis of the type and likely level of NPR-A oil development(s). NPR-A Technical Examinations TE-I.

Simpson, S. G., M. E. Hogan, and D. V. Derksen. in prep.
Behavior and disturbance of moulting Pacific black brant in Arctic Alaska. Unpubl. manuscript. U.S. Fish and Wildl. Serv., Anchorage, AK. 27pp.

Spencer, R. F. 1952.
Forms of Cooperation in the Culture of the Barrow Eskimo. Science In Alaska, Proceedings of the 3rd Conference of the Arctic Division of the American Association for the Advancement of Science. pp. 128-180.

Spencer, M. B. 1952.
The Child in the Contemporary Culture of the Barrow Eskimo. Science In Alaska, Proceedings of the 3rd Conference of the Arctic Division of the American Association for the Advancement of Science. pp. 130-131.

Sterling, T., and A. Dzubin. 1967.
Canada goose molt migrations to the Northwest Territories. Trans. N. Am. Wildl. and Nat. Res. Conf. 32: 355-373.

Stern, R. O., E. L. Arobio, L. L. Naylor, and W. C. Thomas. 1980.
Eskimos, reindeer and land. Agriculture Experiment Station Bulletin 59, University of Alaska, Fairbanks.

Turnbull, C. M. 1968.
The importance of flex in two meeting societies. in Lee, R. B., and I. DeVore (eds.) Man the hunter, Aldine Chicago.

U.S. Department of the Interior. 1978a.
Socioeconomic Profile. National Petroleum Reserve in Alaska (NPR-A), 1977-1978, U.S. Dept. of the Interior, Anchorage. Task Force Study No. 3.

_____. 1978b.
Values and Resource Analysis Vol. 3. National Petroleum Reserve in Alaska (NPR-A), 1977-1978, U.S. Dept. of the Interior, Anchorage. Task Force Study Report No. 2.

_____. 1979.
Native livelihood and Dependance: A study of land use values through time. National Petroleum Reserve in Alaska (NPR-A), 1977-1978, Work Group 1, Field Study 1, U.S. Dept. of the Interior, Anchorage.

U.S. Fish and Wildlife Service. 1983.
Draft Alaska regional resource plan. Unpubl. ms. U. S. Fish and Wildl. Serv., Anchorage, AK. 251pp.

U.S. Geological Survey. 1979.
An environmental evaluation of potential petroleum development on the National Petroleum Reserve in Alaska. U.S. Dept. of Interior. 238pp.

Wellein, E. G., and H. G. Lumsden. 1964.
Northern forest and tundra. Pages 67-76 in Linduska, J.P. (ed.). Waterfowl tomorrow. U.S. Bur. of Sport Fish. and Wildl. Washington, DC. 770pp. (cited from Derksen et al. 1981).

Weller, M. W., and D. V. Derksen. 1979.
The geomorphology of Teshekpuk Lake in relation to coastline configuration of Alaska's Coastal Plain. Arctic 32(2): 152-160.

Whitten, K. R., and R. D. Cameron. 1983.
Movements of collared caribou (*Rangifer tarandus*) in relation to petroleum development on the arctic slope of Alaska. Can Field-Nat. 97(2):143-146.

Woodward-Clyde Consultants. 1980.
Gravel removal studies in arctic and subarctic floodplains in Alaska. U.S. Fish and Wildl. Serv. FWS/OBS-80/08. 403pp.

_____. 1983.
Lisburne Development Area: 1983 Environmental Studies. Prepared for ARCO Alaska, Inc.

BLANK PAGE

APPENDIX I

AUTHORS & PARTICIPANTS INVOLVED IN THE DEVELOPMENT OF THIS HABITAT EVALUATION

I. AUTHORS AND PARTICIPANTS

Chapter 1, 3, 4 and 5 - by James B. Silva

Participants

Alaska Department of Fish and Game
  Habitat Division (Fairbanks)
  Habitat Division (Anchorage)
  Game Division (Fairbanks)
U.S. Fish and Wildlife Service
  Northern Alaska Ecological Services (Fairbanks)
  Regional Office (Anchorage)
North Slope Borough
  Environmental Protection Office
Interested Individuals

Chapter 2

Waterbird Section - by Layne G. Adams

Participants

U.S. Fish and Wildlife Service
  Northern Alaska Ecological Services (Fairbanks)
  Regional Office (Anchorage)
Alaska Department of Fish and Game
  Habitat Division (Fairbanks)
  Habitat Division (Anchorage)
Interested Individuals

Caribou Section - by James B. Silva

Participants

Alaska Department of Fish and Game
  Game Division (Fairbanks)
  Habitat Division (Fairbanks)
  Regional Office (Nome)
North Slope Borough
  Environmental Protection Office
Interested Individuals

BEST COPY AVAILABLE

Subsistence Section - by Robert Gal

Participants

Alaska Department of Fish and Game
  Subsistence Division (Fairbanks)
North Slope Borough
  Environmental Protection Office
Native Allotment Owners
Interested Individuals

II. PHASE 1 WATERBIRD WORKING GROUP

Alaska Department of Fish and Game

Lance Trasky (Anchorage)
Claudia Slater (Anchorage)
Tom Rothe (Anchorage)
Phil Koell (Juneau)

U.S. Fish and Wildlife Service

Derk Derksen (Anchorage)
Mimi Hogan (Anchorage)
Jim Nolke (Fairbanks)

APPENDIX II

LEASE AND PERMIT STIPULATIONS

I. EXISTING BIOLOGICAL/CULTURAL LEASE STIPULATIONS

A. **Habitat Preservation**: (to be included on all lease tracts)

The lessee is given notice that the lands within this lease may include special areas. Such areas may contain special values or may be needed for special purposes. Surface use or occupancy within such special areas will be strictly controlled or, if absolutely necessary, excluded. The lessee will be required to submit plans of operations to the AO who may modify the plans to protect special values and uses. Use or occupancy will be modified or restricted when the AO demonstrates that such is necessary for the preservation of those values or uses.

B. **Cultural Resources**: (to be included on all lease tracts)

Prior to undertaking any surface-disturbing activities on the lands covered by this lease, the lessee, unless notified to the contrary, shall contact the AO to determine if a site specific cultural resource inventory is required. If an inventory is required, the lessee shall:

1. Engage the services of a qualified cultural resource specialist acceptable to the AO to conduct a cultural resource inventory of the area of proposed surface disturbance. The lessee may elect to inventory an area larger than the area of proposed disturbance to cover possible site relocation which may result from environmental or other considerations. An inventory report is to be submitted to the AO for review and approval no later than that time when an otherwise complete application for approval of drilling or subsequent surface disturbing operation is submitted.

2. Implement mitigation measures required by the AO. Mitigation may include the relocation of proposed lease-related activities or other protective measures such as testing, salvage and recordation. Where impacts to cultural resources cannot be mitigated to the satisfaction of the AO, surface occupancy on that area must be prohibited.

The Lessee shall immediately bring to the attention of the AO any cultural resources discovered as a result of operations under this lease and will not disturb such discoveries until directed to proceed by the AO.

C. **Wildlife Conservation**:

This stipulation sets time periods within which activities must be restricted to conserve wildlife resources. Limited exceptions to these stipulations dates may be specifically authorized in writing by the AO if the lessee can reasonably demonstrate to the satisfaction of the AO that such activities would be unlikely to have an adverse effect on these important wildlife resources or their habitats. A decision to exempt must be based on a sound analysis (by lessee) of the type, location, and intensity of the proposed activity and/or density of facilities and the cumulative regional impacts from other user activities/facilities. Prior to development, a NEPA compliance document will be necessary to consider the modification of the following seasonal restrictions to allow for the maintenance and operation of producing wells.

1. Waterbirds (to be included on all lease tracts within waterbird priority habitat areas).

No surface occupancy between May 20th and August 25th in order to protect important waterbird (goose, duck, swan) and shorebird nesting, molting, and staging habitats.

2. Caribou (to be included on all lease tracts within caribou priority habitat areas).

No surface occupancy between May 15th and July 15th for areas used for caribou calving. No activities which would hinder normal caribou movements or calving will be permitted.

Operations proposed between August 15th and September 15th for areas used as caribou migration routes will be restricted. No activities which would hinder normal caribou movements will be permitted.

Operations proposed between June 15th and July 30th for areas used as insect relief areas will be restricted.

D. **Special Management Zone**: (to be included on all lease tracts within special management zones)

The lessee must address the cumulative effects of other industrial activities on the key biological resources. The AO may consider these cumulative effects in deciding to approve, deny, or modify the lessee's proposed operations. If the lessee's primary research indicates a high probability of significant adverse effects on key biological resources, then, in order to operate, the lessee must be able to locate sites, design facilities, and time activities to eliminate these impacts to the satisfaction of the AO.

For any activity in a Special Management Zone, the lessee must reasonably demonstrate either a. or b. (as shown below) to the satisfaction of the AO.

1. That they have conducted primary research on the effects of the proposed facilities/activities on the biological resources present. This research must support a conclusion that all phases of proposed multi-year activities and all facilities will have little or no adverse effects on key wildlife resources or habitats.

2. The primary research and/or current literature on the response of key wildlife to similar disturbances in similar settings support a conclusion that the proposed activity will have little or no permanent adverse effects on fish and wildlife use of habitats because of the following:

a. Operations will not permanently alter the habitat thus precluding fish and wildlife use; and/or

b. Operations will not be conducted during periods of intense fish and wildlife use; or

c. Operations will not be conducted in proximity to important fish and wildlife habitats or to migration routes.

E. Subsistence Lifestyle: (to be included on all tracts where subsistence lifestyle uses occur)

Areas within this lease contain harvestable resources utilized by North Slope residents as part of their subsistence lifestyle. If subsistence impacts are determined to be potentially significant by the AO, the lessee, prior to any drilling, construction, or placement of any exploration and/or development structures on the lease areas, shall gather site specific information using field examination techniques approved by the AO. The field examination(s) shall identify the following:

1. active subsistence hunting, fishing, trapping, or gathering sites;

2. routes of access to sites traditionally used by subsistence hunters, trappers, fishermen and gatherers; and

3. high density areas of harvestable resources within and/or migration routes to, from and within the area(s) of proposed operations.

If the site specific information shows that harvestable subsistence resources may be adversely affected by any lease operations, the lessee shall establish to the satisfaction of the AO that impacts are mitigated by the following:

1. relocating the site of such operations to minimize adverse effects on the harvestable resources; and/or

2. relocating the site of such operations and the design of production, processing and transportation facilities to assure continued access of the subsistence user to the subsistence sites and to areas where the harvestable resources are of known high density; and/or

3. establish that such operations will not have a significant adverse effect upon the harvestable resources, the subsistence sites, and/or the subsistence users' access to the sites or resources after consultation with those rural Alaskans who actively use the area for subsistence.

F. **Subsistence Fisheries**: (to be included on all lease tracts which contain stream, lakes, or estuarious that support a subsistence fishery)

No activities will be authorized within 1/4 mile of aquatic habitat (i.e. streams, lakes, estuarine and marine habitats) which support a subsistence fishery. Limited exceptions may be specifically authorized in writing by the AO if the lessee can reasonably demonstrate to the satisfaction of the AO that such activities would not interfere with continued subsistence use.

G. **Environmental Training**: (to be included in all lease tracts)

In any application for permit to drill submitted under 43 CFR 3160, the lessee shall include for review and approval by the AO a proposed environmental training (ET) program for all personnel involved in exploration or development activities. The program shall be designed to inform each project employee of the specific types of environmental, social and cultural concerns which relate to each individual's job. The program shall be formulated and conducted by qualified instructors experienced in the pertinent fields of study. They shall use methods to assure that personal can recognize and will conserve archeological, geological, and biological resources. The ET program will cover lessee's policies and techniques to avoid harassment of wildlife. The program shall increase the sensitivity and understanding of personnel to local community values, customs, and lifestyles. Information on local subsistence activities should be included in order to minimize potential conflicts. The lessee shall also submit for review and approval a technical environmental briefing program for supervisory and managerial personnel.

EXISTING PERMIT STIPULATIONS

A. General

1. Seismic operations are to begin only after the seasonal frost in the tundra and underlying mineral soils has reached a depth of 12 inches; the average snow cover depth of 6 inches.

2. Seismic operations will cease when the spring melt of snow begins; approximately May 5th in the foothill areas exceeding 300 feet in elevation; approximately May 15th in the northern coastal areas. The cut-off date will be as determined by the Authorized Officer.

3. All activities shall be conducted so as to avoid or minimize disturbance to vegetation. To prevent surface disturbance, tracked vehicles will not execute tight turns by locking on track.

4. There shall be no vegetation clearing within the floodplain or along banks of any rivers. All high brush areas will be avoided where possible. If there are areas that cannot be avoided, the brush may be walked down, but no brush clearing will be allowed.

5. Crossing of waterway courses shall be made using a low angle approach in order not to disrupt the naturally occurring stream or lake banks.

6. No bulldozing of tundra areas, trails, or seismic lines will be allowed. This stipulation, however, does not prohibit the clearing of drifted snow along a trail or seismic line nor in a camp, to the extent that the tundra mat is not disturbed. Also, it does not prohibit the clearing of snow on a lake or river ice surface in order to prepare an aircraft runway.

7. Temporary camps will not be located on frozen lakes or river ice. Camps will be situated on gravel bars, sand, or other durable lands. Where leveling of trailers or modules is required and the surface has a vegetative mat, leveling will be accomplished with blocking rather than leveling with a bulldozer.

8. All operations shall be conducted in such a manner as to not cause damage or disturbance to any fish, wildlife resource, or subsistence uses.

9. A hazardous liquid spill control and contingency plan will be submitted to the Authorized Officer prior to beginning operations.

10. All fuel containers used, including drums and propane tanks shall be marked with the contractor's name, fuel type, and date, such as Geophysical Services Inc., Hydraulic Fuel, 1983.

11. Caches of fuel greater than 550 gallons shall be within a standard bermed pit with liner that could contain at least 110% of all fuel stored.

12. Although fuels may be off-loaded from aircraft on the ice there will be no fuel storage or refueling of equipment on lake or river ice, even on a temporary basis.

13. All fuel spills will be cleaned up immediately, taking precedence over all other matters, except the health and safety of personnel. Spills will be cleaned up utilizing absorbent pads or other approved methods. As soon as possible, but not later than 24 hours, notice of any such discharge as defined in Alaska Statute Title 18, Chapter 75, Article 2, will be given to the AO, and other Federal and State officials as are required by law.

14. Absorbent material must be available at each fuel cache in sufficient quantities to absorb all fuel spilled.

15. The operator shall inform its employees, agents, contractors, sub-contractors, and their employees of applicable laws and regulations relating to hunting, fishing, and trapping.

16. The permittee and his employees, agents, contractors, subcontractors and their employees are prohibited from feeding wild animals or birds or from leaving garbage or other potentially edible items which would attract wild animals or birds. Garbage will be kept in covered containers while waiting incineration.

17. All flights conducted in the operating area shall be maintained at such minimum altitude above, and horizontal distances from, wildlife as to avoid harassment or disturbance thereof.

18. All operations shall comply with applicable "Water Quality Standards" of the State of Alaska as approved by the Environmental Protection Agency. Waste water shall receive treatment conforming to federal requirements for secondary treatment if arctic-tested package treatment facilities are used. Gray wash water and kitchen waste water may be filtered to remove the solids and the liquid discharged to the land surface. All solids and sludges shall be incinerated.

19. A solid waste management plan must be approved by the Alaska Department of Environmental Conservation prior to initiating field work. (Ref. Public Law 94-580) If approved by the Department of Environmental Conservation, all combustible solid waste, including cartons and used lubricating oils will be incinerated or returned to an approved disposal site. All non-combustible solid waste, including fuel drums, will be returned to an approved disposal site. There will be no burial of garbage or the dozing up of any area for the burial of anything.

20. Seismic lines shall be left clean of all foreign debris. This shall include, but is not limited to, wire, lathe, pin flags, and reflectors.

21. The operator shall protect all survey monuments, witness corners, and reference monuments from destruction, obliteration, or damage. He shall, at his expense, re-establish damaged, destroyed, or obliterated monuments and corners in their original exact position. A record of the re-establishment shall be submitted to the AO.

22. The Antiquities Act of June 8, 1906 (34 Stat. 225; 16 U.S.C. 431-433) prohibits the appropriation, excavation, injury, or destruction of any historic or prehistoric ruin or monument, or any other object of antiquity, situated on lands owned or controlled by the United States. No historic site, archeological site, or camp, either active or abandoned, shall be disturbed in any manner nor shall any item be removed there from. Should such sites be discovered during the course of field operations, the BLM Arctic Area Manager for Arctic Resource Area will be promptly notified.

23. All operations must not impede rural residents from pursing their traditional subsistence activities (ANILCA, Pub. L. 96-487).

B. Biological

1. Caribou

a. Aircraft shall maintain 2,000 foot altitude over designated caribou calving areas between May 15th and June 30th, unless doing so would endanger human life or safe flying practices.

b. Aircraft shall maintain 2,000 foot altitude over caribou insect relief areas between July 1st and July 31st, unless doing so would endanger human life or safe flying practices.

BEST COPY AVAILABLE

c. Aircraft shall maintain 1,000 foot altitude over caribou concentration areas, such as winter & summer ranges, etc., unless doing so would endanger human life or safe flying practices.

d. Operations will not hinder normal caribou movements.

e. Ground level activities, such as ground crews, vehicles, should not approach animals on designated caribou calving grounds closer than 3,000 feet (1000 m) between May 15th and June 30th.

f. Designed solution.

That the lessee(s) have conducted primary research on the effects of the proposed facilities/activities on the biological resources present. This research must support a conclusion that all phases of proposed multi-year activities and all facilities will have little or no adverse effects on key wildlife resources or habitats or

The primary research and/or current literature on the response of key wildlife to similar disturbances in similar settings support a conclusion that the proposed activity will have little or no permanent adverse effects on fish and wildlife use of habitats because of the following:

(1). operations will not permanently alter the habitat thus precluding fish and wildlife use; or

(2). operations will not be conducted during periods of intense fish and wildlife use; or

(3). operations will not be conducted in proximity to important fish and wildlife habitats or to migration routes.

2. Fisheries

a. All operations shall be conducted with due regard for good resource management and in such a manner as not to block any stream, or drainage system, or change the character or course of a stream, or cause the pollution or siltation of any stream or lake.

b. No fuel storage or refueling of equipment shall be allowed within the floodplain of a river or lake.

c. No activities will be authorized within 1/4 mile of aquatic habitat, such as streams, lakes, estuarine and marine habitats, which support a subsistence fishery.

POTENTIAL LEASE/PERMIT STIPULATIONS

A. No surface occupancy for a particular period of time, such as between May 15 to June 30.

B. No surface disturbance (Note: winter exploration activities conducted under proper conditions and stipulations would not be considered surface disturbance).

C. No permanent facilities, including roads and/or pipelines.

D. Deep exploratory wells requiring reoccupancy of a site for drilling in a second winter for completion are considered preferable to all-season operations.

E. No permanent facilities during exploration activities.

F. Shepard et al. (1982), concluded through meetings with industry that the following modifications to normal operations would be feasible to help reduce aircraft disturbance.

1. Supply and shift change flights could remain at high operating altitudes until about one to three miles from the end of the airstrip;

2. Storage capacity for fuels and other supplies could be increased so that the number of days on which flights into sensitive environments occurred could be substantially reduced (fuel flights could, for example, occur on every tenth day rather than every other day); and,

3. If the roads along the pipeline were private and security of the pipeline good, then pipeline monitoring flights could be less frequent than daily.

APPENDIX III

CARIBOU/WATERBIRD IMPACT ANALYSIS WORKSHOP

(Gilliam and Lent 1982)

Summary of Conclusions and Recommendations

I. CARIBOU

A. "The impacts of exploratory activities can be avoided, reduced or mitigated if stipulations appropriate to the season and location are applied".

B. "Leasing of areas east, north and south of Teshekpuk Lake should be deferred at least until the end of the proposed five-year leasing program (Figure 26). Prior to any leasing, the Federal government must undertake comprehensive studies of the Teshekpuk Lake Herd as a basis for the development of appropriate stipulations and detailed management plans for the area. Deferment of development and production in the Teshekpuk Lake area until after the decline in production form the Kuparuk and Prudhoe Bay fields is strongly recommended".

II. WATERBIRDS

A. "Delete the Teshekpuk Lake/Cape Halkett area (Teshekpuk Lake goose molting area) from leasing consideration (Figure 26)".

B. "Do not permit any permanent roads to/from Camp Lonely, Cape Halkett or Kogru River DEW line site".

C. "Design lease/permitting stipulations to insure no surface occupancy or bmpacts to the coastal salt marshes, lagoons, barrier islands, or shorelines of: Fish Creek/Colville River Delta and Kogru River".

D. "Design and provide for effective enforcement of specific (within 20 miles of the coastline) and general (for all of NPR-A's Coastal Plain) lease/permitting stipulations to protect waterbird habitats and use. These stipulations must be flexible enough to allow additional protections to be placed on any newly identified areas that site-specific studies may indicate are critical to waterbirds.

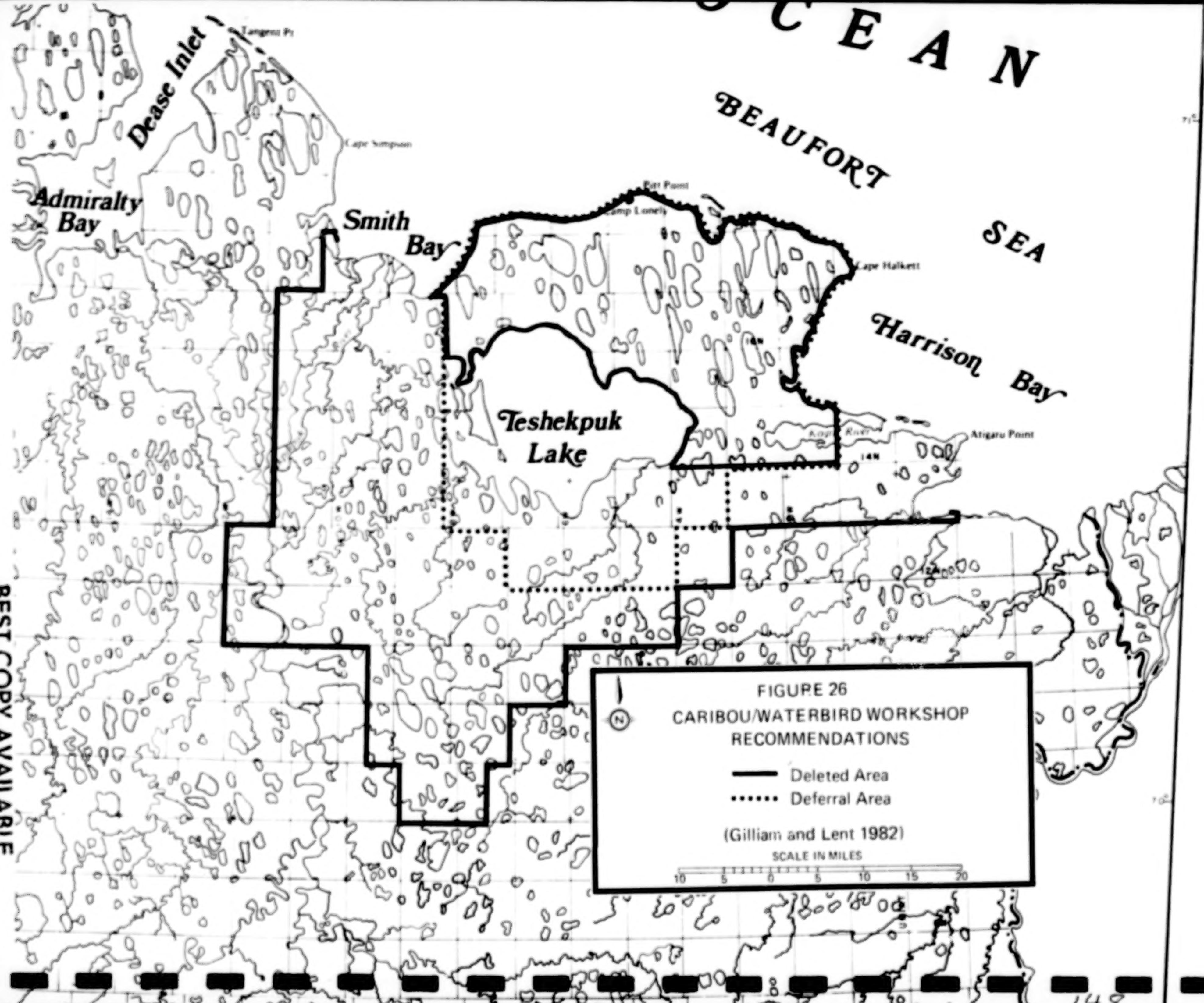


FIGURE 26
CARIBOU/WATERBIRD WORKSHOP RECOMMENDATIONS

(Gilliam and Lent 1982)

APPENDIX IV

LAND STATUS

I. FEDERAL LANDS

A. Right of Way Permits

Serial No.	Name	Location (Umiat Meridian)	Acreage
F-13920	U.S. Coast Guard	T.14N. R.1E. Sec. 21 T.17N. R.2W. Sec. 13	10 5
F-23298	U.S. Coast Guard	T.18N. R.8W. Sec. 35	.92
F-81306	Federal Aviation Administration	T.18N. R.5W. Sec. 18	.98
F-81467	U.S. Airforce	T.18N. R.5W. Sec. 8, 9, 16, 17, 21 and 22	2,830.0
Subtotal - Rights of Way			2,846.9

B. Temporary Use Permits

F-81305	Cook Inlet Regional	T.18N. R.5W. Sec. 18	15.5
F-83651	North Slope Borough	T.16N. R.7W. Sec. 21	1
Subtotal - Temporary Use Permits			16.5
Total Federal Lands -			2,863.4

II. PRIVATE LANDS

A. Native Allotments

F-14611	Brenda Itta	T.18N. R.3W. Sec. 26	160
F-14645	Dorcas W. Ballot	T.15N. R.3W. Sec. 29	160
F-14616-A	Noah Itta	T.15N. R.3W. Sec. 30 T.15N. R.3W. Sec. 31	80
F-14616-B		T.15N. R.9W. Sec. 07	80
F-14613	Edward S. Itta	T.14N. R.4W. Sec. 15	160

A. **Native Allotments** (Cont.)

Serial No.	Name	Location (Umiat Meridian)	Acreage
F-14614	Mary K. Itta	T.14N. R.5W. Sec. 34	160
F-14606	Frieda Elavak	T.18N. R.6W. Sec. 23 T.18N. R.6W. Sec. 24 T.18N. R.6W. Sec. 25 T.18N. R.6W. Sec. 26	160
F-14604	Lillian N. Cummer	T.18N. R.6W. Sec. 33 T.18N. R.6W. Sec. 34	160
F-17447	David K. Elaugak	T.17N. R.6W. Sec. 04 T.17N. R.6W. Sec. 09	160
F-11725	Gerald Sakeagak	T.17N. R.6W. Sec. 04 T.17N. R.6W. Sec. 09	160
F-14619	Loretta Kenton	T.17N. R.8W. Sec. 29	160
F-14621	Bentha A. Leavitt	T.17N. R.8W. Sec. 32	160
F-14622	Jonah Leavitt	T.16N. R.9W. Sec. 24	18.5
F-15512	Martha Matumeak	T.15N. R.9W. Sec. 08 T.15N. R.9W. Sec. 09	160
F-15499	Joseph Elavgak	T.15N. R.9W. Sec. 21 T.15N. R.9W. Sec. 22	160
F-14637-C	Wyman Panigeo	T.16N. R.10W. Sec. 29	40
F-14647	Harry Kaleak	T.15N. R.10W. Sec. 10 T.15N. R.10W. Sec. 11	160
F-14581	Kenneth Brower	T.11N. R.10W. Sec. 12 T.11N. R.10W. Sec. 13	80
F-16294-B	Mary Edwardson	T.11N. R.12W. Sec. 24 T.11N. R.12W. Sec. 25 T.11N. R.11W. Sec. 19	80
F-15500	Joe Ericklook	T.12N. R.12W. Sec. 26	160
F-14466	Robert Brower Jr.	T.12N. R.12W. Sec. 05	160
F-15519	Joseph Panigeo Sr.	T.12N. R.12W. Sec. 06	160
F-15520	Joseph Panigeo Jr.	T.12N. R.12W. Sec. 06 T.12N. R.13W. Sec. 01	160

BEST COPY AVAILABLE

A. **Native Allotments** (Cont.)

Serial No.	Name	Location (Umiat Meridian)	Acreage
F-15513	Marchie Nageak	T.12N. R.12W. Sec. 07	160
F-14467	Sally Brower	T.12N. R.12W. Sec. 05	160
F-13511-A	Arnold Brower Sr.	T.11N. R.12W. Sec. 03	40
Subtotal - Native Allotments			3,618.5

B. **Corporation Lands**

1. Regional Corporation Lands

Serial No.	Name	Location (Umiat Meridian)	Acreage
I.C. 468	Arctic Slope Regional Corp.	T.17N. R.02W. Sec. 02	
		T.17N. R.02W. Sec. 11	
		T.17N. R.02W. Sec. 12	
		T.17N. R.02W. Sec. 13	
		T.17N. R.02W. Sec. 24	
		T.17N. R.02W. Sec. 25	
		T.17N. R.02W. Sec. 36	3,085
		T.17N. R.01W. Sec. 07	
		T.17N. R.01W. Sec. 17	
		T.17N. R.01W. Sec. 18	
		T.17N. R.01W. Sec. 19	
		T.17N. R.01W. Sec. 20	
		T.17N. R.01W. Sec. 29	
		T.17N. R.01W. Sec. 30	2,473
Subtotal - Regional Corporation Lands			5,558

2. Village Corporation Lands

Serial No.	Name	Location (Umiat Meridian)	Acreage
I.C. 109	Kuugpik Corp. Inc (Nuiqsut Village)	T.13N. R.2E. Sec. 06	
		T.13N. R.2E. Sec. 07	
		T.13N. R.2E. Sec. 08	340
I.C. 113		T.14N. R.2E. Sec. 19	
		T.14N. R.2E. Sec. 20	
		T.14N. R.2E. Sec. 29	
		T.14N. R.2E. Sec. 30	
		T.14N. R.2E. Sec. 31	720
Subtotal - Village Corporation Lands			1,060

Subtotal - Native Allotments	3,618.5
Subtotal - Regional Corporation Lands	5,558
Subtotal - Village Corporation Lands	1,060
Total Private Lands	10,236.5

APPENDIX V

COMMENTS RECEIVED ON THE DRAFT HABITAT EVALUATION

BLANK PAGE

IN REPLY REFER TO:
4251.5 (298)

United States Department of the Interior
BUREAU OF LAND MANAGEMENT
FAIRBANKS DISTRICT OFFICE
1541 Gaffney Road
Fairbanks, Alaska 99703

MAY 4 1985

Memorandum

To: Jim Silva (298)

From: DM-F

Subject: Comments on Draft Teshekpuk Lake Special Area Study Habitat Evaluation

Thanks for the opportunity to comment on the draft Habitat Evaluation. We offer the following comments:

Page iii

The statement that up to 23% of world's population of black brant molt in TLSA tends to mislead the reader when reviewed against Table 3.

Page iv

The last sentence in paragraph 3 is a conclusion that should be brought out in Phase 2. The word "high" in paragraphs 4 and 5 should be defined.

Page 1

In paragraph 6, the second sentence states that this document will identify the incompatibilities between subsistence uses and oil and gas activities. Should this comparison be in phase 2? See statement on page 4, second sentence under III. - Management Goals and Objectives.

Page 4

Section 202 of PL 94-579 (FLPMA) should not be used as authorizing legislation since the Appropriations Act of 1981 specifically exempted NPRA from that section of FLPMA.

Page 5

The first complete sentence should be left out because examples are not needed in stating the objectives. The third sentence in paragraph 3 of this item is opposite from what is said on page 1, paragraph 6.

Page 6

The conclusion that this HE has not demonstrated that the above conditions have been met, should be brought out in phase 2 and not in phase 1. In the first line of Part V, a better phrase for "an independent minerals evaluation" would be to use "a separate Minerals Evaluation."

Page 7

In the next to last sentence of the third paragraph of Part I. - Introduction, the wording should be clarified to indicate that an EIS is not required for an exploration well.

Pages 9 and 10

Under Land Status, there are several references in parentheses to Appendix V; Appendix IV should be included in those references. In addition, the oil and gas tracts, lease number, lessee, name, location, and acreage should be added to Appendix IV.

Page 46

First word on last line - Change "should" to "could." This is Phase 1, not Phase 2.

Page 99 and 100

There is considerable description of the existing environments which was discussed in Chapter 2. This chapter should be confined to a summary of protective measures.

Page 100

Protective measure no. 3 - Reword to "No permanent facilities would be allowed."

Protective measure no. 5 - Why not make this altitude and date match the one set for peregrine falcons? This would give waterbirds a little more protection, and stay consistent with other aircraft stipulations.

Page 101

Protective measure no. 7 - (2nd Sentence) Should "Area 2" be "Zone 2"?

Page 102

Protective measure no. 10 - Suggest same as for peregrine falcon. Second sentence under C. Zone 3 - Define "high" as you have used the same word description for Zone 2.

IN REPLY REFER TO:

United States Department of the Interior
6780 (240)
2360
BUREAU OF LAND MANAGEMENT
WASHINGTON, D.C. 20240

JUN 20 9 58 AM '85

Memorandum

To: Deputy Director for Lands and Renewable Resources (200)

Through: Assistant Director, Renewable Resources (210)

From: Chief, Division of Wildlife (240)

Subject: General Comments on Habitat Evaluation for Teshekpuk Lake Special Area Study

The analysis of biological values in Chapter 2 and the summary of protective measures in Chapter 3 are very well thought out and make good use of existing information and literature to develop various sections. We would like to offer the following suggestions, recognizing the short time frames involved, the size of the area, and the level of existing data.

- Each of the priority wildlife species should have habitat and population objectives established to define specific management direction. This could be accomplished with broad objectives for each zone and further broken down into more specific objectives for geographic areas based on molting, staging, nesting, or calving, etc.
- Although it is often very difficult to assess potential land use actions as pointed out by the authors, it may be appropriate to establish some well defined assumptions on various levels of oil and gas exploration and production to better structure the sensitivity to impacts sections.
- Under the socioeconomic significance and concerns sections of Chapter 2, no analysis of the potential economic values of waterfowl in regard to hunting in wintering areas in Canada and the U.S. are made. Moreover, a discussion on the projected economic value of subsistence use for hunting, trapping, and fishing could also be included under appropriate sections.
- As identified in the fisheries section, limited information on important aquatic habitats will make the analysis difficult. Without a clear understanding of sheet flow and cross-drainage, it would be extremely important to determine the location and extent of key habitat areas for fish and waterbirds. Again, specific objectives should be established for aquatic resources if possible.

- The fisheries resources section should be expanded to discuss the biological values in association with oil and gas development and production of coastal environments. What effects to fish and wildlife resources can be expected from onshore facilities needed to support offshore oil and gas development as addressed in the minerals evaluation? How will nearshore and offshore oil and gas development affect goose molting areas and fishery resources and what protective measures or stipulations are necessary to manage coastal environments?
- A section on the analysis of existing and potential habitat rehabilitation efforts and techniques would strengthen the protective measures sections and lease and permit stipulations (Appendix II). What types of surface-disturbing activities are reclaimable and which are not under current technologies? A case history examination of similar areas may be helpful to look at rehabilitation successes and failures.
- Another consideration, which will probably have to be delayed until HMP development, is the determination of threshold levels for wildlife habitat and populations, which are usually a composite of objectives and assumptions. Through the establishment of threshold levels you can more easily address cumulative impacts. Threshold levels could be described as minimum acceptable areas of available habitat for molting, nesting, staging, calving, etc., or expressed as density or relative abundance for priority species according to geographic areas. Admittedly, it is often difficult to determine wildlife thresholds without adequate biological information.

It is apparent throughout the habitat evaluation that more detailed fish and wildlife information is necessary, as outlined in the Study Needs section. It will be essential to obtain this information to develop good HMP objectives and to determine long-term cumulative impacts to fish and wildlife resources. Good aerial photography coverage (1:24,000) is essential during HMP development to classify wetlands, map habitat sites, and to make better use of aerial survey information and identify key wildlife areas. As pointed out, an aquatic resource inventory is imperative to more accurately define important aquatic habitats (migration, spawning, and overwintering) and to establish specific HMP objectives.

The acquisition of basic habitat information through baseline inventories to provide for establishment of a well organized and effective monitoring program will be a key factor in management of the wildlife resources.

I recommend that the foregoing comments be provided to the Teshekpuk team on an informal basis. Given the time frames and availability of existing data, the overall effort has been sound. Our suggestions are offered in the spirit of general assistance only.

Attachments

155

BEST COPY AVAILABLE

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

NORTHERN ALASKA ECOLOGICAL SERVICES
Room 222, Federal Building, Box 20
101 12th Avenue
Fairbanks, Alaska 99701-6267

June 20, 1985

Mr. Jim Silva
Bureau of Land Management
Post Office Box 1150
Fairbanks, Alaska 99707

Re: Teshekpuk Lake Draft Habitat
Evaluation

Dear Mr. Silva:

The U.S. Fish and Wildlife Service has reviewed the Draft Habitat Evaluation (HE) for the Teshekpuk Lake Special Area (TLSA) study. The description of resource values contained in the HE is comprehensive and generally provides a good summary of existing information for the Teshekpuk Lake area. We believe that there are several points which should be addressed to improve the scope and content of this report and enhance its value as a planning document.

The Fish and Wildlife Service (FWS) has consistently viewed the Teshekpuk Lake area as one of the most important habitats in Arctic Alaska for waterbirds, caribou and freshwater fish populations. In 1983, when the Bureau of Land Management (BLM) prepared an Environmental Impact Statement (EIS) for oil and gas leasing on the National Petroleum Reserve- Alaska (NPR-A) we strongly recommended deletion of the Teshekpuk Lake area from potential leasing. The Record of Decision (ROD) for the EIS indicated that this would be an appropriate method for protecting the area.

The FWS has agreed to the BLM process which precludes recommending deletion of areas from leasing during Phase 1 of the study, but not during Phase 2. We believe that the HE should discuss the alternative of not leasing as a means of protecting the TLSA. The draft HE contains only a few brief references to the deletion option, which gives the impression that this is not being seriously considered. A detailed discussion of the deletion concept, including its procedural and legal implications should be provided. The ROD for the NPR-A EIS indicated that a 217,000-acre portion of the TLSA would be deleted from leasing unless one of three conditions were met in the future. The HE briefly addresses this issue on page 4, and states that the HE has not demonstrated that the conditions have been met. This whole issue of deletion should be discussed in much greater detail.

As an active participant (along with Alaska Department of Fish and Game) in the development of the waterbird portion of the HE, we provided the BLM with information and recommendations regarding delineation of important habitats in the TLSA. The State and FWS recommended an area for Zone 1 that was more inclusive than the one shown in the HE (figure 13). It included areas that 1) provide high value habitat for tundra swans, ducks and shorebirds, 2) provide a necessary buffer to molting geese which are highly sensitive to disturbance, and 3) protects fishery resources and subsistence values which may otherwise not be adequately protected. The intent of Phase 1, as stated in the HE, is to provide, independently, an "up-to-date analysis" of biological and mineral values within the TLSA (page 4, paragraph 5). We believe that the boundary lines should be redrawn to reflect these agency concerns and recommendations.

Fishery resources in Teshekpuk Lake and tributary or adjacent watersheds should receive greater treatment in the HE. The value of the fishery resources in the Teshekpuk area goes well beyond that of subsistence. It represents a unique freshwater fishery in Arctic Alaska. As now written, fishery resources would receive protection only from subsistence related stipulations. We recommend that fishery resources be treated as a separate issue in a manner similar to caribou.

The HE does not address mitigation and compensation of unavoidable impacts to fish and wildlife resources. With the issue of cumulative impacts becoming more critical as oilfield development expands beyond the Prudhoe Bay area, a consistently applied and predictable mitigation policy is vital. We recommend that guidelines be established by which unavoidable resource losses are identified and compensated.

In addition to these general concerns, we have attached comments directed at specific sections of the report.

We appreciate the opportunity to provide comments on the Teshekpuk Lake Draft Habitat Evaluation.

Sincerely yours,

Jerald Stroebele

Jerald Stroebele
Field Supervisor

Attachments

cc: Lance Trasky ADF&G, Anchorage
Tom Rothe, ADF&G, Anchorage

Specific Comments on the Draft
Teshekpuk Lake Special Area Habitat Evaluation

Page 4, Objective 6: In addition to "severe limitation," we believe that this objective should state that in some instances it may be necessary to prohibit oil and gas leasing to protect sensitive habitats and priority species of wildlife.

Page 5, paragraph 3 & Page 11, paragraph 2: Tundra swans should be mentioned here as a priority species. The North Slope swan population is an important component of the Eastern Population of tundra swans. The TLSA has approximately five times the average density for tundra swans compared with the rest of NPR-A. In the national Draft Management Plan for the Eastern Population of Tundra Swans, protection of breeding range is identified as a high priority for meeting population objectives. The plan points out that although the breeding range of Eastern Population tundra swans is large, the habitats used are relatively specific and are vulnerable to degradation. Swans are particularly susceptible to the potential development in the TLSA.

The tundra swan account on page 17 should point out that swans are valued for viewing and photography throughout the U.S. and Canada and that they are sources of recreational hunting in Montana and North Carolina.

Page 16, paragraph 3: Change "widgeon" to wigeon.

Page 17, paragraph 3: Treatment of the significance of international treaties should be expanded. Treaties require more than protection of migratory birds so "that citizens can utilize and enjoy them". The Migratory Bird Treaty between the U.S. and U.S.S.R. (1978) supplements and strengthens previous treaties. It directs each Nation to undertake measures necessary to protect and enhance migratory bird environments and prevent and abate pollution or detrimental alteration of their habitats. It also stipulates that each Nation shall, to the maximum extent possible, establish preserves, refuges, protected areas and facilities for migratory birds and their habitats and manage them to preserve and restore natural ecosystems.

Page 17, (a) Population Status, Pacific Black Brant: The Yukon-Kuskokwim Delta Goose Management Plan was signed in March 1985 by five cooperators: the FWS, the California Department of Fish and Game, the Alaska Department of Fish and Game, the Association of Village Council Presidents, and the Association's Waterfowl Conservation Committee. Harvest provisions of the Y-K Delta Goose Management Plan prohibit subsistence hunting for brant during nesting, brood rearing, and molting periods and no eggs may be gathered. New key features of the plan include population objectives and management thresholds. Proposed population objectives for brant are 185,000 birds with a harvest management threshold of 120,000 birds and a harvest resumption level of 140,000 birds.

Page 19, paragraph 1, sentence 4: The socioeconomic significance of brant to subsistence harvest is inadequately addressed with one brief sentence. Black brant from the Y-K Delta breeding population are known to use the Teshekpuk Lake complex for molting. The people of the Y-K Delta have made concerted efforts to reduce subsistence harvest of brant and have participated in the development of the Yukon Delta Goose Management Plan in order to restore the brant population. Declines in the brant population due to impacts to molting areas of TLSA will have far reaching socio/economic and political consequences.

Page 36, paragraph 4: BLM presently stipulates that "no flights below 1500 feet Above Ground level will be allowed over important waterfowl habitats"; however, this may not be an adequate stipulation for Zone 1 or 2 and should be noted here.

Page 40, paragraph 4: Both State of Alaska and FWS biologists participating in the development of the waterbird portion of the HE agreed that limiting construction to specific seasons is not in itself an adequate safeguard. Even minimum maintenance and operation in some areas in the summer may be too great a disturbance risk for high value wildlife areas, particularly molting goose habitat.

Page 43, paragraph 3: The impacts to goose habitat may be impossible to predict but it should be pointed out that the consequences of displacement of geese may very likely result in population declines.

Page 46, paragraph 1: Following the first sentence in this paragraph it should be pointed out that the swan nesting habitat occurs in Zone 2 which has less protected status and therefore may be more susceptible to disturbance impacts.

Page 46, paragraph 6: Area (Zone) 3 contains very little nesting, molting or staging habitat for swans.

Page 52, Area 3: Protective measures for Area 3 should include a requirement for a comprehensive oilfield development plan that addresses such issues as consolidation of facilities, mitigation and compensation of unavoidable impacts.

Page 91, paragraph 5: A statement is made that, due to limited fisheries survey data, important migration, spawning and overwintering habitat has not been specifically identified. Fishery resources have been addressed only under subsistence issues and, although we feel subsistence is extremely important, it is not our only concern. At present, only those streams that are designated as important for subsistence are protected. This likely does not include all fish bearing streams in the area. Fishery resources should be discussed as a separate topic in the HE. The discussion should include the importance of the fishery resource in Teshekpuk Lake, its tributaries, and adjacent watersheds and identify measures to assure a high level of protection.

Page 97, paragraph 4: This paragraph discusses protective measures that are applied to fishery resources. It indicates that the application of the subsistence fisheries stipulation will adequately protect the subsistence values in the area. The stipulation, as stated in Appendix II, protects only identified subsistence fish streams. As stated above, this is not all-inclusive enough to protect the integrity of the Teshekpuk Lake fishery. The stipulation should be expanded to cover all fish bearing streams in Zone 2 and all streams tributary to Teshekpuk Lake in Zones 2 and 3.

Page 99, Zone 1: Interchanging the words "Priority Area," "Area" and "Zone" throughout the HE is confusing. One consistent label should be used.

DISTRICT OFFICE
FAIRBANKS, ALASKA

STATE OF ALASKA

BILL SHEFFIELD, GOVERNOR

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

DIVISION OF PLANNING, NORTHERN REGION

[illegible]
[illegible]
[illegible]

June 3, 1985

Re: Draft Teshekpuk Lake Special
Area Study, Habitat Evaluation

Jim Silva
Bureau of Land Management
P.O. Box 1150
Fairbanks, AK 99707

Dear Mr. Silva:

The Department of Transportation and Public Facilities (DOT&PF) has reviewed the Draft Habitat Evaluation for the Teshekpuk Lake Special Area Study. We recognize that the Habitat Evaluation has been prepared with the specific objective of assessing the potential impacts of Oil and Gas Development in the Teshekpuk Lake Area. DOT&PF is particularly interested in the recommendations of the study because the Department is responsible for the development and maintenance of public transportation facilities in the State. The protective measures stipulated in the study for Oil and Gas Development infrastructure will also impact the DOT&PF if we are to develop any type of transportation facility in the study area in the future.

The FY86 Capital Budget authorized by the Alaska State Legislature and currently under consideration by the Governor, contains a project to construct a public road from the community of Nuiqsut to Kuparuk. This road will be financed with federal funds and will be the first phase of a larger public transportation corridor from the Dalton Highway to the Community of Barrow. The reconnaissance phase of the project will determine the routing of the corridor, and to what extend the Teshekpuk Lake Area would be affected.

Chapter 3 of the Habitat Evaluation provides a description of the division of the study area into three zones and the development protective measures proposed for each zone. Page 101 summarizes the protective measures that are to be applied in Zone 2. Protective measure #3 states that although local service roads and utility corridors could be permitted, no regional transportation or utility corridors would be allowed. The report does not provide the rationale for prohibiting regional transportation or utility corridors. Given the fact that a regional transportation corridor has been proposed for the area, and the liklihood that its development in the near future is great, the Teshekpuk Lake Special Area Study should at least provide a framework for addressing such development rather than providing solely prohibitive language.

Thank you for the opportunity to comment on the Draft Habitat Evaluation. We would appreciate an indication from you as to how our comments can be accommodated in the Teshekpuk Lake Special Area Study. We look forward to reviewing additional elements of the Study as they become available.

Sincerely,

Jonathan Widdis

Jonathan A. Widdis, Manager
Area & Local Planning

HKS:tc

cc: Mike Menge, Bureau of Land Management, Anchorage
Mike Tinker, Environmental Coordinator, Northern Region, DOT&PF

STATE OF ALASKA
OFFICE OF THE GOVERNOR
OFFICE OF MANAGEMENT AND BUDGET
DIVISION OF GOVERNMENTAL COORDINATION

BILL SHEFFIELD, GOVERNOR

CENTRAL OFFICE
POUCH AW
JUNEAU, ALASKA [illegible]
PHONE (907) [illegible]

SOUTHEAST REGIONAL OFFICE
[illegible] NORTH FRANKLIN
POUCH AW, SUITE [illegible]
JUNEAU, ALASKA [illegible]
PHONE (907) [illegible]

SOUTHCENTRAL REGIONAL OFFICE
[illegible] DENALI STREET
SUITE [illegible]
ANCHORAGE, ALASKA [illegible]
PHONE (907) [illegible]

NORTHERN REGIONAL OFFICE
[illegible] SEVENTH AVENUE
STATION H
FAIRBANKS, ALASKA [illegible]
PHONE (907) [illegible]

July ˉ, 1985

Mr. Jim Silva
Bureau of Land Management
P.O. Box 1150
Fairbanks, AK 99707

Dear Mr. Silva:

The State of Alaska appreciates the opportunity to review and comment on the Draft Habitat Evaluation for the Teshekpuk Lake Special Area Study.

At the outset, I would like to say how much we have appreciated the effort and cooperation by the Bureau of Land Management in your development of the Draft Habitat Evaluation. We look forward to this continued cooperative effort and discussions in the coming months as you begin to formulate specific land management policies for the Teshekpuk Lake Special Area.

In addition to our page-specific comments, provided as Enclosure 1 to this letter, we also recommend that the comments submitted on the Draft Habitat Evaluation be included as an appendix to the final document. This would provide Phase 2 and Phase 3 decision-makers with easy access to all information and comments submitted during development of the Teshekpuk Lake Special Area evaluation report.

Another matter of concern to the State, when reviewing the Draft Habitat Evaluation was the fact that it included and discussed potential mitigation measures. We were of the understanding that the purpose of the Habitat Evaluation was to objectively evaluate and summarize all pertinent and available scientific information relative to the surface resource values of the Teshekpuk Lake Special Area. While we recognize that Phase 1 participants were specifically requested to identify "criteria" necessary for protection of biological resources (e.g., restrictions on the use of permanent facilities, seasonal surface use restrictions), we do not believe it is appropriate to discuss mitigation or specific protective measures in the Habitat Evaluation. Since the Draft Habitat Evaluation discusses specific protective

measures and has been circulated for public review, we feel compelled to forward to you comments that we received on those portions of the document. It is important to recognize that those comments, provided as Enclosure 2 to this letter, are a reflection of statements and comments made by Phase 1 participants during review of the Draft Habitat Evaluation. The State's position on appropriate mitigation will be formulated after land management decisions for the Teshikpuk Lake area have been made.

The literature cited in the Draft Habitat Evaluation is fairly complete. However, the waterbird sensitivity impact discussions in the Draft Habitat Evaluation are somewhat inadequate in their coverage of the pertinent literature. We generally feel that many of the references that were cited contain additional and pertinent material that was not included as information in the Draft Habitat Evaluation. We encourage you to work with our State biologists in an effort to try and include and more fully utilize all pertinent and available information contained in the literature cited prior to publication of the Final Habitat Evaluation.

Finally, we also believe that it would be appropriate, in Chapter 1 to recognize federal requirements for reviewing the consistency of activities with the Alaska Coastal Management Program and the North Slope Borough Coastal Management Program, particularly in relation to exploration and development within the National Petroleum Reserve - Alaska (Section 307 of the Coastal Zone Management Act of 1972, as amended).

Again, we very much appreciate your cooperation and all of the hard work that you put into this effort.

Sincerely,

Robert L. Grogan
Associate Director

Enclosures

ab85070101rsd

cc: Michael Penfold, BLM, Anchorage
Robert Gilmore, USFWS, Anchorage
Mike Menge, BLM, Anchorage
Jack Mellor, BLM, Fairbanks
Bruce Baker, DFG, Juneau
Jim Eason, DNR, Anchorage

ENCLOSURE 1

PAGE SPECIFIC COMMENTS ON THE TESHEKPUK LAKE SPECIAL AREA STUDY DRAFT HABITAT EVALUATION

(Enclosure to Robert Grogan's July 8, 1985 response to Jim Silva regarding the Draft Habitat Evaluation for the Teshekpuk Lake Special Area Study)

Executive Summary

Page iii, paragraph 3: The second sentence in this paragraph states: "This area [Teshekpuk Lake Special Area] is the only known molting resort for non-breeding geese on the arctic coast of Siberia and North America." Although the Teshekpuk Lake Special Area (TLSA) is clearly the most significant molting resort for non-breeding geese in the two areas identified, there are other areas that support non-breeding geese during the molt. We suggest that this statement be modified as follows:

> "This area is the [only] largest known molting resort for non-breeding geese on the arctic coast of Siberia and North America."

This correction should also be made on page 12, paragraph 4 and on page 42, paragraph 4.

Page iv, paragraph 2: We agree that Zone 1 of the TLSA supports "crucial" biological resources. However, as currently written, this portion of the executive summary gives a somewhat unbalanced impression. When referring to the potential impacts of oil development on biological resources, the statement is made that industrial activities: ". . . would result in impacts that could alter the present use of the area by waterfowl and other wildlife species." There is no indication, however, of how severe the environmental impacts could be. On the other hand, when referring to the consequences of proposed mitigative measures on oil industry activities, it is stated that: "The measures . . . would make oil and gas activities very difficult to conduct and or preclude them as they are presently conducted on the North Slope." Although it is clearly stated how the oil industry will be affected by the mitigation, a rather weak statement is made about the potential impacts of oil and gas activities on the area's "crucial" biological resources. While the State's position has not yet been developed with regard to appropriate habitat protection measures, it should be stated in the Habitat Evaluation (HE) that State & Federal biologists participating in both the National Petroleum Reserve in Alaska (NPR-A) Waterbird Impact Analysis Workshop (Gilliam and Lent, 1982) and Phase 1 of the Teshekpuk Lake Special Area Study (TSAS) believe that adverse impacts to waterbirds would be severe.

Chapter 1 - Purpose for Action

Page 1, paragraphs 3 and 4: These paragraphs describe Phases 2 and 3 of the TSAS, which will constitute the decision-making steps in the planning process. Reference is made to the identification of areas to be leased and adoption of mitigative measures, however there is no clear indication that a prohibition of land use activities within at least a portion of the Special Area will also be considered. This prohibition could include, but not necessarily be limited to, oil and gas exploration and development. Although such an outcome will certainly depend upon the results of the Habitat and Mineral Evaluations this option should be mentioned in all appropriate sections of the HE and subsequent documents.

Page 4, paragraph 1: This paragraph briefly discusses the authority and legislative directives pertinent to management of the TLSA and preparation of the HE. We believe that this discussion should be expanded to address information directly applicable to this topic. Section 104(b) of the National Petroleum Reserves Production Act of 1976 states that exploration in the Teshekpuk Lake Special Area ". . . shall be conducted in a manner which will assure the maximum protection of such surface values to the extent consistent with the requirements of this Act for the exploration of the reserve." The Committee of Conference for the Act elaborated upon the intent of Section 104(b), and stated: "Specifically, [the Secretary] should conduct exploration activities [in the Teshekpuk Lake Special Area] when the caribou calving season and the nesting and molting seasons of the birds can be avoided." Formulated after the Act, the regulations codified in Subpart 2361l, Title 43 -- Public Lands, Interior, state that: ". . . the authorized officer may limit, restrict, or prohibit use of and access to land within the reserve, including special areas, . . . " to protect environmental values.

The Department of the Interior Appropriation Act of 1981, which provides for an expeditious program of competitive oil and gas leasing in the NPR-A, specifically requires that: ". . . any exploration or production undertaken . . . shall be in accordance with Section 104(b) of the National Petroleum Reserves Production Act of 1976." If oil and gas development or production is impossible or impractical under conditions of seasonal closure and other constraints needed to protect caribou and waterfowl, the authorized officer has the authority to "prohibit use of and access to lands" within the special areas.

It is important to incorporate the above information into the "Authority and Legislative Directives" section of the Final HE. The draft document only mentions the Federal Land Management Policy Act, P.L. 94-579, Section 202 and the Alaska National

Interest Lands Conservation Act (ANILCA), P.L. 96-487. Clearly, the National Petroleum Reserves Production Act and associated regulations should be discussed in the HE, since they were specifically developed to govern oil and gas activities within the NPR-A.

The final HE should additionally discuss the relationship between the Federal Land Management Policy Act and the National Petroleum Reserves Production Act. According to the draft HE, P.L. 94-579, ". . . mandates multiple and sustained use of all resources on the public lands . . ." It is important to note however, that some land uses are not always compatible. The potential incompatibility of certain land uses was recognized by Congress when the National Petroleum Reserves Production Act was passed. Protection of surface values are discussed in the Act, and the associated regulations specifically state that the BLM's authorized officer may " . . . limit, restrict, or prohibit use of and access to lands within the reserve, including special areas, . . . to protect environmental values. State and Federal biologist's participating in both the NPR-A Waterbird Impact Analysis Workshop (Gilliam and Lent, 1982) and Phase 1 of the TSAS believe that if oil development occurs in the northern portion of the Special Area, it will not be possible to maintain the waterbird resources of the area using current industrial technologies.

Page 4, paragraph 5: Objective 2 is intended to identify important or crucial habitat. To assist Phase 2 and Phase 3 decision-makers, terms such as "important" and "crucial" need to be defined.

Page 4, paragraph 5: Objective 4 notes that: " . . . a severe limitation on oil and gas leasing or related development activities may be necessary for the protection of sensitive habitats and priority species of wildlife." As mentioned earlier in our comments, if a prohibition of land use activities within at least a portion of the Special Area is a possibility, this should be so stated.

Page 6, paragraph 3: This paragraph discusses the Teshekpuk Lake Special Management Zone, which encompasses over 50 percent of the TLSA. The paragraph states that: " . . . a special Design Solution stipulation was developed for the Special Management Zone which allows oil and gas activities to occur only after sufficient study of cumulative impacts (Appendix II)." This statement is somewhat misleading because it implies that oil and gas activities will be allowed, provided that the required study is completed. It is important to note that, based on the results of the study, the Authorized Officer may deny or require modifications to the proposed operations.

Moreover, once a lease has been issued the lessee has a legal right to develop oil and gas resources. If, following issuance of a lease, studies indicate that oil and gas production is incompatible with maintenance of biological resources, production can nevertheless be permitted to proceed.

CHAPTER 2 - BIOLOGICAL AND SUBSISTENCE VALUES

Waterbirds

Pages 12 - 34: The species accounts for waterbirds are generally thorough and provide a good overview of information pertinent to the HE. Portions of the waterbird discussion need to be expanded and/or revised, particularly the sections dealing with the sensitivity of waterbirds to disturbance and the potential environmental impacts of oil and gas activities. Specific comments on these portions of the waterbird discussion are presented below.

Pages 19, paragraph 4: This paragraph should be revised to clarify the statement regarding exploration and development in brant breeding areas. There are no current plans by the State to lease in the Yukon Kuskokwim Delta or in adjacent nearshore waters. You may also want to note that Chevron U.S.A., Inc. drilled the cited exploratory well northeast of Teshekpuk Lake. That well, Chevron Livehorse II, was plugged and abandoned making this area less promising for future exploration.

The latter half of this same paragraph discusses "threats" to the ecological integrity of the TLSA. It refers to the Arctic Slope and Cook Inlet Regional Corporations and their respective holdings at Cape Halkett and Camp Lonely. The Bureau of Land Management (BLM) has also leased portions of the TLSA and may lease additional acreage in the near future. BLM's previous leasing actions could provide the impetus for development of the TLSA, ultimately resulting in significant adverse impacts to biological resources. This paragraph should be revised to show that the BLM's leasing actions, and any subsequent oil and gas activities, could also affect the integrity of habitats within the Special Area.

Page 21, paragraph 6: This paragraph briefly discusses the sensitivity of black brant to impacts. It correctly notes that black brant are highly susceptible to human disturbance. Only three references are cited, however, which represents only a small portion of the available information. The last sentence of this section (page 23) states: "A thorough discussion of potential impacts of oil and gas related activities on waterbirds is presented in a later section entitled "Discussion - Sensitivity to Impacts." Although the referenced section deals with impacts, that section does not deal with species' sensitivities, with the exception of the aircraft disturbance material. The sensitivity of waterbirds to disturbance and potential impacts of industrial development are not necessarily synonymous topics. For example, the discussion on exploratory drilling (page 35) largely focuses on contamination of habitats, a brief overview of the impacts of pollution on waterbirds (e.g., "physiological problems"), and general strategies to avoid habitat contamination. There is nothing in this discussion regarding species sensitivities to pollutants.

When commenting on the preliminary draft waterbird discussion, the Alaska Department of Fish and Game (ADF&G) recommended that the species sensitivity section be expanded to include all pertinent information, but these sections were not revised as originally requested. The species sensitivity sections for Canada Geese (page 24), white-fronted geese (page 28), and snow geese (page 32) are also very abbreviated and do not adequately cover the available information.

It should also be noted that the "Discussion - Sensitivity to Impacts" section is not a "thorough discussion" of potential oil and gas-related impacts. Again, the material on exploratory drilling serves as a good example. This discussion shows that contaminants have wide-ranging impacts on habitats. It also acknowledges that animals can suffer form a variety of physical, physiological, and other problems as a result of contamination. The remainder of the material identifies various types of toxic substances, and general strategies to avoid pollution. This discussion represents a very brief overview of the habitat contamination issue, not a "thorough discussion" of the topic.

As indicated in the draft HE, the protective measures that might be recommended for much of the TLSA could have significant effects on the oil industry's capability to pursue development of an oil field in this area. While we believe that it is premature to discuss specific protective measures at this phase of the process, it is important that the HE present a comprehensive analysis of the sensitivity of waterbirds to oil and gas activities. Such comprehensive analysis will be necessary for Phase 2 and Phase 3 participants to establish specific measures that might be necessary to mitigate impacts to waterfowl and other biological resources. The draft HE is seriously lacking is this regard. Although this portion of the document is more thorough than the species sensitivity sections, it should be expanded.

For these reasons, we believe it is important that the species sensitivity sections in the HE be substantially modified to incorporate all available pertinent information, and that the "Discussion - Sensitivity of Impacts" section be expanded to represent a "thorough" discussion, as stated in the document. At a minimum, this section should be revised according to our comments which follow on that specific portion of the draft HE.

Page 35, paragraphs 4 and 5 (item c): It is stated that: "Pads, roads and airstrips associated with temporary exploratory activity in the TLSA will likely be built of ice or manufactured materials. . ." We agree that these construction methods would probably result in fewer environmental impacts, as compared to gravel structures, provided that facilities are properly sited, constructed and maintained. However, at this point in the planning process, use of such techniques is an assumption and may not be required. If gravel structures are a possibility, it is important to acknowledge, in the HE, the potential biological and habitat impacts associated with their use. Gravel roads, in particular, have the potential to significantly impact wetland habitats and species dependent upon those habitats, according to biologists. Consequently, if gravel structures are allowed during exploration, such facilities would not be "temporary," nor would the impacts of the structures be "minimal." Considering this, item c on page 35 should be revised to acknowledge the potential environmental impacts of using gravel facilities.

With regard to potential and lasting impacts from use of gravel support facilities, it should be noted that page 3 of the draft Mineral Evaluation status report states that: "One mile of road disturbs about 5 acres of surface . . ." However, in the draft HE (page 38) it is stated that "Since 1969, over 150 miles of road have been constructed in the Prudhoe Bay field, resulting in 45 square miles of chronic impoundments. That amounts to an average of 192 acres per road mile "(J. Nolke, FWS, personal communication). This comparison illustrates that total habitat lost or altered by gravel placement could far exceed the apparent direct physical loss of habitat due to construction of facilities, according to J. Nolke.

Finally, while biologists concur that water withdrawals from lakes can impact lakes and adjacent wetlands, this paragraph should also note that fish populations and, in turn, subsistence harvest activities can also be adversely affected by water removal. Maintaining adequate fish overwintering habitat is particularly important to protection of fisheries resources on the North Slope.

Page 36, paragraph 3: This paragraph states that the remainder of the discussion on exploration impacts assumes that an aircraft overflight restriction will be in force over most or all of the TLSA between May 1 and September 30. It is important to recognize that this is an assumption and may not be required, since there is no legal means of enforcement without concurrence from the Federal Aviation Administration. Considering this, the HE should include a brief discussion of impacts likely to occur if such as overflight restriction is not implemented or adequately enforced.

Page 36, paragraph 4: Biologists believe that disturbance of waterbirds by aircraft overflights is a primary concern in relation to oil and gas development in the TLSA. Stating that this ". . . may be the most important chronic impact affecting these populations . . ." is too strong, however, and tends to downplay other potential impacts. Extensive habitat alteration and ground level disturbance, for example, may also result in significant adverse impacts to waterbirds. Minimizing aircraft disturbance will not alleviate all key concerns or, in itself, provide adequate protection to internationally significant waterbird populations. Therefore, aircraft disturbance should be identified as only one of several potential impacts of primary concern to biologists.

This paragraph also states that BLM permits require that: ". . . no flights below 1000 feet Above Ground Level (AGL) will be allowed over important waterfowl habitats . . . ." According to black brant research conducted by Derksen et al. (1979), recent observations of brant at Izembek Lagoon, and the consensus of the Phase I Waterbird Working Group, a 1,000-foot overflight restriction is not adequate to prevent disturbance of molting and staging black brant. This should be noted at the end of paragraph 4, page 36.

Page 36, paragraph 5: Define "large number of private flights . . ."

Page 37, paragraph 1: Biologists agree that it is sometimes difficult to predict, with certainty, the effects of specific land use activities on wildlife species or their habitats. However, according to Phase I participants, this paragraph on the effects of an oil production facility in the TLSA does not accurately reflect the anticipated impacts to waterbirds and wetlands. The first portion of the paragraph states that: ". . . it is safe to predict that if high value habitats for waterbirds are impacted, then their value to those waterbirds will be reduced." Although this is a "safe" prediction, it is of little utility since it gives no indication of the potential magnitude of the adverse effects. The second half of this paragraph more accurately reflects the consensus of waterfowl experts participating in the NPR-A Waterbird Impact Analysis Workshop. That is, ". . . almost certain displacement of molting geese" (Gilliam and Lent, 1982). We suggest acknowledging that it is not possible to make a definitive statement, but that expert opinions are available. The paragraph should include the opinion of the NPR-A Waterbird Panel and also note that the same consensus was reached by biologists participating in the HE Phase I Waterbird Working Group.

Page 38, paragraph [illegible]: Again, this paragraph downplays the potential impacts of oil and gas development on wetland habitats. It states that: "At the very least, some areas will be wetter and others drier than before development . . . ." This statement has very little meaning because the significance of such habitat alteration is not discussed. The reader should be apprised that State and Federal biologists believe that development of an oil field will likely involve extensive loss and alteration of wetlands, as evidenced in the Prudhoe Bay and Kuparuk oil fields. Additionally, biologists believe that this type of widespread habitat alteration is likely to result in significant adverse impacts to waterbirds. At a minimum, displacement of birds can be anticipated. If suitable habitats are not available and used by the birds elsewhere, it is believed that species abundance would likely decline.

Also, according to biologists, it should be noted that oil field development in the TLSA could have significant deleterious effects on freshwater wetlands, as well as coastal salt marshes. According to field biologists and hydrologists, experience to date indicates that there has been very little success in maintaining the integrity of freshwater wetlands within North Slope oil fields. As stated earlier in the paragraph, an estimated average of 192 acres of impoundments have resulted from the construction of each mile of gravel road in the Prudhoe Bay field.

Page 38 - 40, Aircraft Disturbance Section: As previously noted, this portion of the "Discussion - Sensitivity to Impacts" section is the only portion of the discussion that actually refers to the sensitivity of waterbirds to disturbance. However, the sensitivity information presented in this section is incomplete and somewhat misleading. This is partially the result of pertinent references being left out of the discussion, and partially due to the omission of pertinent citations from several of the references that are utilized. For example, Davis and Wisely (1973) studied the reactions of snow geese to aircraft overflights and related this information to the effects of disturbance on the energy reserves of the birds. Their study is not referenced in the draft document.

As mentioned in our cover letter, another problem with this discussion is that pertinent information from some of the references cited is not used in the draft HE. For example, on page 38, paragraph 2, the draft document refers to information contained in Schweinburg et al. (1974). All that is stated in the discussion is that most existing information, including this report, deals with evaluating the effects of various overflight characteristics (e.g., altitude, volume) on waterfowl responses to aircraft disturbance. It is not mentioned that Schweinburg et.al (1974) reported that Canada geese deserted traditional molting grounds when subjected to harassment. Clearly, this information is germane to the discussion, since Canada geese are a species of primary concern and they both nest and molt in the TLSA.

In addition to the report discussed above, there are six other citations included in the first paragraph of the aircraft disturbance section. As with Schweinburg et al. (1974), they are only referred to in a very general manner. Most of them are not cited again, so the reader is never informed about the basic study and results of the research. Consequently, there is very little value in citing these studies.

For these reasons, we believe that the entire aircraft disturbance section should be rewritten to more fully incorporate all pertinent information. As currently written, this portion of the draft HE is incomplete and somewhat misleading. As noted earlier, it is important that this portion of the document be thorough and accurate.

Page 39, paragraph 4: In addition to the general comments above on the aircraft disturbance section, we have another comment on a specific statement made on page 39. Biologists agree that disturbance to birds can effect their ability to maintain or replenish fat reserves. However, not all biologists are convinced that: "The ultimate effects of the energy loss associated with disturbance are virtually impossible to assess." As previously noted, Davis and Wiseley (1973) conducted a study on the North Slope designed to document the effects of aircraft overflights on snow geese. The following statement is an excerpt from the findings of that research:

> "Non-experimental aircraft disturbances averaged 0.25 per daylight hour. These resulted in a potential decrease of 2.6% in time spent feeding. Experimental overflights at two hour intervals by fixed-wing aircraft produced more severe reactions. These caused an 8.1% decrease in feeding time, and could cause a reduction of 20.4% in the energy reserves that juvenile geese can acquire on the North Slope in preparation for migration. The corresponding figure for overflights by small helicopter is a possible reduction of 9.5%. These potential decreases are dependent upon the extent of accommodation and the ability to increase overall feeding efforts."

Given information of this nature, along with other data such as the amount of energy (in kilocalories) birds require to migrate to wintering grounds, a reasonable indication of the effects of disturbance to birds can be obtained. To our knowledge, this type of data is not currently available for most key waterbird species in the TLSA. That is not to say, however, that it can not be obtained and utilized in assessing potential impacts.

Page 40, paragraph 4: This paragraph discusses the possibility of minimizing human disturbance to waterbirds by completing construction activities during the winter when birds are not present in the area. The final HE should note that biologists participating in both the NPR-A Waterbird Impact Analysis Workshop and Phase I of the TSAS believe that this strategy will not afford an adequate level of protection to waterbirds in the northern portion of the Special Area. Aside from the habitat loss and alteration that results from permanent structures, they believe that wildlife would be disturbed during sensitive periods since permanent facilities would have to be operated and maintained year around.

Page 41, paragraph 1: Biologists agree that there is less documentation about the impacts of chronic contamination on wildlife species and habitats, than on the effects of more catastrophic spills. The environmental consequences of a catastrophic spill would depend upon a variety of factors, such as the areal extent of pollutants and whether habitats supporting high densities of one or more species are contaminated. However, this paragraph should note that biologists feel that the impacts of chronic contamination may, in fact, be more deleterious to biological resources in the long-term than a single, major spill event.

Page 42, paragraph 5: The last sentence in this paragraph states: "If oil development is authorized in the TLSA, it is imperative that these [waterbirds] values be adequately protected." This statement implies that mitigation can be implemented which would allow oil development to proceed in the TLSA, while providing adequate protection to waterbird resources. Although it is premature to discuss mitigation at this phase of the process, it should be recognized that State and Federal biologists, knowledgeable in this field, do not believe that it is possible to develop an oil field in the northern portion of the Special Area and still maintain the present waterbird values (Gilliam and Lent, 1982).

Page 43, paragraph 3. This paragraph should be expanded to indicate the potential impacts of displacing molting geese from the TLSA. Biologists have indicated that if displaced birds are unable to find and use alternate molting and staging habitats, such displacement would cause the geese populations to decline. This is particularly likely of black brant since such a large portion of the population molts and stages in the TLSA, and the population has already experienced a serious decline.

Page 43, paragraph 4: Salt-influenced wetlands along the coast of the TLSA provide most of the habitat for staging, rather than molting, geese. The second sentence in this paragraph should be revised to reflect this fact.

Page 46, paragraphs 3 and 4: Similar to previously discussed sections of the draft RE, these paragraphs imply that waterbird resources can be adequately protected should oil development occur within the TLSA. For example, paragraph 4 states: "Any oil or gas development that occurs must be . . . strictly controlled to ensure protection of important biological values . . ." Again, we believe it is premature to discuss mitigation at this phase of the process. The final RE should note that State and Federal biologists participating in the NPR-A Waterbird Impact Analysis Workshop (Gilliam and Lent, 1982) and Phase 1 of the TERS have stated that oil development in the northern portion of the Special Area would not be compatible with maintaining current levels of waterfowl resources in the area due to disturbance and habitat impacts.

Pages 46 and 51, Area 1 Waterbird Protective Measures: During most of Phase 1 of the TERS, participants from all agencies approached the RE with the understanding that all pertinent biological data would be evaluated, and appropriate management recommendations would be developed, based on that evaluation. Area 1, as identified by the U.S. Fish and Wildlife Service (USFWS) and ADF&G, encompassed Teshekpuk Lake and lands immediately south and west of the lake. Near the end of Phase 1, ADF&G and USFWS were advised by BLM that the approach to the RE recommendations section would be.

One result of the revised approach, and of particular concern to biologists, was a change that the BLM made in the southern boundary of Area 1.[1] Rather than including Teshekpuk Lake, the southern boundary of BLM's Area 1 runs along the northern shore of the lake. State and Federal biologists continue to believe that in terms of wildlife values and for management purposes, Area 1 should include Teshekpuk Lake and lands immediately south and west of the lake (Enclosure 3). The BLM has previously been advised of this by both the ADF&G and USFWS Phase 1 participants. As currently written, the draft RE does not include Teshekpuk Lake in Area 1, nor does it discuss the discrepancy between the BLM's Area 1 and the Area 1 identified by the ADF&G and USFWS. We believe it is important that Phase 2 and 3 participants are aware of this fact.

---

[1] An "area" is used in the context of a geographic region of important fish and wildlife value. In the next paragraph the term "zone" is used to describe a geographic region from a management perspective.

On December 19, 1984, and January 19, 1985, the Phase 1 Waterbird Working Group identified the area that they felt should be included in Zone 1 (see Enclosure 3). Contrary to the BLM's Zone 1, the area delineated by Phase 1 ADF&G and USFWS representatives encompassed Teshekpuk Lake and lands immediately south and west of the lake. Biologists believe that this southern expansion of Zone 1 is justified for several reasons. First, as acknowledged on page 99, paragraph 2, "Recent observations have documented that during molting and staging (June 1 through September 30), black brant and other geese are disturbed by even low levels of human activities." Research indicates that geese exhibit escape responses considerable distances away from the actual source of disturbance. Considering this, if geese are to be adequately protected from disturbance-related impacts, it is necessary to ensure that crucial habitats are buffered from potential sources of disturbance. BLM's Zone 1 does not provide for a buffer since the southern boundary runs immediately adjacent to the highest density goose nesting and molting areas. Extending the boundary south, as envisioned by the ADF&G and USFWS Phase 1 Waterbird Working Group, would provide a natural buffer for these "crucial" habitats. Federal and State biologists have also indicated that Teshekpuk Lake should be included within Zone 1 to ensure protection of valuable fisheries resources. As indicated on page 81 of the draft RE, "...contamination of Teshekpuk Lake, its tributaries or any major stream or river could cause significant effects on the overall fisheries populations within [the] TLSA." Finally, as noted on Page 91 and in Figure 23, fishing is the most important harvest activity in areas recognized as having the highest subsistence potential, and Teshekpuk Lake encompasses a majority of the area within that category. Therefore, including Teshekpuk Lake in Zone 1 would also provide a higher level of protection for a valuable subsistence harvest area. For these reasons, State and Federal biologists believe that the Zone 1 boundaries recommended by the ADF&G and USFWS Waterbird Working Group representatives should be adopted.

From a biological perspective, the Final RE should acknowledge that both the NPR-A Waterbird Impact Analysis Panel and the Phase 1 Waterbird Working Group believe that oil and gas development in Zone 1 is not compatible with maintenance of the area's waterbird resources. Both groups have consistently maintained that oil and gas development in this portion of the TLSA will be at the expense of the waterfowl that nest, molt, and stage in the area. This point was discussed at every Waterbird Working Group meeting and at a meeting held on February 26, 1985, which included other Phase 1 participants. At that time, it was the understanding of State biologists that BLM would specifically acknowledge this point in the RE.

Caribou

Pages 53 - 57: The caribou distribution and habitat use section adequately summarizes available information on the Teshekpuk Herd (TH). The draft RE does not adequately acknowledge, however, that relatively little information is available on the herd. The status of Teshekpuk caribou as a discrete herd was only recognized in the mid-1970's. The first aerial consensus of the herd was made last year. According to biologists, very little is known about calving areas, insect relief habitats, or wintering areas of the TH. There is virtually no published information on the migration routes or movement patterns of this caribou population. The relationship of the TH to adjacent caribou herds is also unknown, and specific harvest data are lacking. Biologists believe it is important that the RE acknowledge the limited nature of current information on the TH since an adequate baseline data is essential to proper management of this caribou population, particularly in light of possible oil and gas development in this region. Specific research needs for the TH are identified in our comments on Chapter 3, Section III, "Study needs." Comments on the Chapter 1 caribou discussion are presented below.

Page 53, paragraph 2: This paragraph discusses recent population estimates for the TH and notes that estimates have increased from 3,000 to 4,000 animals in 1979 to at least 11,800 caribou in 1984. The last sentence in the paragraph states that this increase is likely due to past counting inaccuracies and an actual increase in herd size. State biologists believe that better knowledge of herd identity is another significant factor in the 1984 increased population estimate. We suggest that this be incorporated into the discussion.

Page 53, paragraph 3: This paragraph states that the caribou population of Alaska totals about 490,000 animals, and the TH represents approximately 2 percent of that total population. Although these figures are correct, State biologists believe that it is important to acknowledge that caribou herds are and must be managed as discrete entities, not as a single population. Each herd has separate calving areas, different growth rates, largely separate ranges, and other individual characteristics. This is significant because if land use activities impact the TH, the impact will be to a discrete group of animals, rather than a small percentage of a single, large entity. Therefore, we request that the draft RE address this point.

Page 54, paragraph 1: The second sentence in this paragraph states: "Identification of important (traditional) calving areas is a subjective process because of the continuous movement of caribou throughout their range and the variation in density of calving animals." This statement is somewhat confusing and should be clarified. Although caribou move throughout their range and calving density is not uniform, identification of traditional calving areas is not a subjective process. Perhaps the intent of this statement is to indicate that prioritizing the relative importance of various caribou habitats is a subjective process. If so, this is an important distinction, and should be clarified.

Page 54, paragraph 2: State biologists agree that information on the TH prior to 1978 indicates that caribou calving occurred to the southwest of Teshekpuk Lake. They also concur that data gathered since 1978 indicates that wetlands to the northeast of the lake support the highest densities of calving caribou. However, to minimize subjectivity as much as possible, BLM should revise the statement that: ". . . this area (Figure 14) is presently considered the important calving area for this population (emphasis added)." State biologists believe that the area northeast of Teshekpuk Lake should be referred to as the highest density calving area presently being used by the herd, rather than "the important" calving area.

Page 57, paragraph 1: The last sentence in this paragraph states: "The caribou within the TLSA do not appear to have clearly defined migration routes . . ." As previously discussed, biologists have indicated that little is known about the migratory patterns of the TH and that the apparent lack of "clearly defined migration routes" may well be the result of our limited knowledge. Consequently, we suggest that this portion of the caribou discussion be revised to reflect this point. The RE should also note that biologists believe that in the event of oil and gas development, maintenance of caribou movement zones may be a primary concern in protecting the herd. If important movement corridors exist between large waterbodies, permanent facilities in these locations could constrict caribou movements. An example would be the area located between Kogru Inlet and the east end of Teshekpuk Lake.

Page 57, paragraph 2: Biologists agree that caribou populations are dynamic, and that the TH may increase or decline in the future due to natural factors unrelated to industrial development. Biologists also concur that the relationships between caribou herds in arctic Alaska are poorly understood and require further long-term study. However, it is not clear what the significance of this information is to the rest of the caribou section on "Existing Distribution and Habitat Use." This portion of the caribou discussion should either be deleted or expanded to more fully develop the information presented, and to clarify the significance of that information in relation to the distribution and habitat use section.

Page 58, paragraph 4: This paragraph discusses loss of habitat as a result of oil development. It is stated that direct habitat loss ". . . would generally be small in comparison to the overall area available." It should be noted, however, that biologists believe that alteration of small areas can potentially have significant impacts on wildlife, if the areas altered support large concentrations of animals and/or are used during critical life functions. An example would be high density caribou calving habitat. In relation to indirect habitat loss due to altered drainage patterns, this paragraph states that proper engineering could help alleviate this type of potential impact. As previously noted, it should be acknowledged that biologists and hydrologists believe that current development practices on the North Slope have not been entirely successful in maintaining the natural hydrology of wetland areas.

Subsistence Values

Pages 65 - 96: The subsistence discussion in the draft ME provides a good summary of information pertinent to the TLSA. The use of geocoding respondent data by systematically merging the individual maps for all resource use categories represents a novel approach. It makes a positive contribution, not only to the ME, but also to our general understanding of Inupiat land use.

Chapter 3 - Summary of Protective Measures for Combined Values

Page 99, paragraph 1: The last sentence in this paragraph states: "They [the protective measures] are intended to protect crucial biological populations and subsistence uses of the TLSA, while allowing oil and gas leasing and development to occur." This statement appears to ignore the express purpose of the TLSA. It is our understanding that the goal of the Special Area Study is to analyze and compare known surface values and potential sub-surface values of the TLSA, and reach decisions on: (1) what acreage, if any, should be deleted from leasing consideration; (2) what acreage should be offered for lease, and 3) what mitigation will be required for acreage that is offered. The statement noted above directly contradicts our understanding, as it implies that leasing of the TLSA is a forgone conclusion. We do not believe that it is your intent to give this impression and would therefore recommend that this statement be revised to reflect the true purpose of the TLSA.

Pages 103 - 104, Study Needs: We agree with the study needs identified in the draft ME. Furthermore, we also recommend that the additional research needs and revisions, outlined below, be incorporated into the final document:

Caribou

1. An aerial photo census of the TH should be conducted every two years. Information obtained from the censuses, coupled with data acquired from the radio-collaring project, would also help provide necessary baseline data on: 1) the status and trends in population size of the TH, and 2) the timing and location of caribou migration routes or movement corridors.

2. A long-term study (e.g., five to ten years) on the relationships between the TH, Central Arctic and Western Arctic caribou herds should be initiated. As indicated on page 57 of the draft ME, the relationships between these herds are poorly understood.

3. A public education program in the communities of Barrow, Atqasuk and Nuiqsut should be initiated and maintained to improve local knowledge of caribou research activities and management practices in the TLSA.

In addition, we recommend that this portion of the final ME also address the important research value of the TH. Should oil and gas development occur in the TLSA, this herd offers an unusual opportunity to acquire pre-development baseline data to assess the impacts of industrial activities on caribou. Adequate baseline data was not collected on the Central Arctic Herd prior to development of the Prudhoe Bay and Kuparuk oil fields. Research on that herd essentially began concurrently with oil field development, making it more difficult to determine the effects of oil and gas activities on the caribou population. This problem could be avoided in the TLSA if adequate (e.g., two years of intensive research) baseline data on the TH is obtained prior to any oil and gas development. Acquiring definitive impact information would also assist in ensuring that the best management strategies are implemented to reduce potential adverse impacts on the herd.

Subsistence

1. If the decision is made to continue oil and gas leasing in the TLSA, a cooperative long-term inventory and monitoring program on subsistence uses within the Special Area should be initiated between the BLM, USFWS, and State of Alaska. Such a study would provide resource management agencies with a solid data base with which to evaluate the effects of development on subsistence harvest activities.

2. Qualitative questions about subsistence land and resource use within the TLSA should be addressed. For example, research is needed on how subsistence use areas change over time, and what causes these changes (e.g., environmental factors, technological changes, development-related impacts). Additional studies are also needed to determine how the size and location of subsistence use areas differ in the TLSA in relation to species abundance and availability, use by different communities or kinship groups, and variable use by regions.

ab#5070101red

Literature Cited

Davis, R.A. and A.N. Wiseley. 1974. Normal behavior of snow geese on the Yukon-Alaska North Slope and the effects of aircraft-induced disturbance on this behavior, September, 1973. In: P.W.G. Gunn, W.J. Richardson, R.E. Schweinsburg and T.D. Wright (Eds.). Studies on Snow Geese and Waterfowl in the Northwest Territories, Yukon Territory, and Alaska, 1973. Arctic Gas Biological Report Series, Vol. 27, Chap. II.

Derksen, D.V., W.D. Eldridge, and T.C. Rothe. 1979. Waterbird and wetland habitat studies. In: NPR-A Work Group 3. Studies of Selected Wildlife and Fish and Their Use of Habitats on and Adjacent to the National Petroleum Reserve in Alaska 1977-1978. Vol. 2, pp. 229-311. U.S. Bureau of Land Management, Alaska State Office, Anchorage. pp. 421.

Gilliam, J.K., and P.C. Lent. 1982. Proceedings of the National Petroleum Reserve in Alaska (NPR-A) Caribou/Waterbird Impact Analysis Workshop. May 11-13, 1982, Anchorage, Alaska. U.S. Bureau of Land Management, Alaska State Office, Anchorage. Final Report. 60 pp.

Schweinsburg, R.E., Gollop, and R.A. Davis. 1974. Preliminary waterfowl disturbance studies, Mackenzie. Valley, August, 1972. In: Gunn, W.W., and J.A. Livingston (Eds.). Disturbance to Birds by Gas Compressor Noise Simulators, Aircraft, and Human Activity in the Mackenzie Valley and the North Slope, 1974. Arctic Gas biological Report Series, Vol. 14, pp. 232-254.

ENCLOSURE 2

PAGE SPECIFIC COMMENTS BY PHASE 1 PARTICIPANTS ON PROTECTIVE MEASURES CONTAINED IN THE TESHEKPUK LAKE SPECIAL AREA STUDY DRAFT HABITAT EVALUATION

(Enclosure to Robert Grogan's July 8, 1985 response to Jim Silva regarding the Draft Habitat Evaluation for the Teshekpuk Lake Special Area Study).

The following comments and statements were provided by Phase 1 participants during review of the Draft Habitat Evaluation and are based solely on biological recommendations.

Page 36, paragraph 2: Phase 1 biologists agree that: "Material sites cannot be rehabilitated sufficiently to restore wetland values and should not be authorized in wetlands for temporary facilities." It should also be noted that roads, pads and other gravel structures cannot be rehabilitated to adequately restore wetland values. Therefore, because of the highly productive and sensitive nature of the TLSA, gravel structures should be prohibited during the exploration phase, with the possible exception of limited drill pads.

Pages 51 and 52, Area 2 Waterbird Protective Measures: Because of BLM's revised approach to the HE recommendations section, it may not be clear to Phase 2 and 3 participants that Phase 1 representatives also recommended that leasing not occur within Area 2, unless absolutely necessary. This is implied in the last paragraph on page 51, but it may not be clear to decision-makers. It is essential that Phase 2 and 3 participants fully understand this point. The protective measures identified for Area 2 in the Draft HE were developed as a contingency plan, with the understanding that leasing would occur only if the Minerals Evaluation indicated that economically exploitable oil and gas reserves were likely to be present. If high oil and gas potential is present in Area 2, and it is determined that leasing in this area is in the national interest, the protective measures outlined on page 52 of the draft HE should be implemented, with the revisions noted below:

1. Consistent with the ADF&G's January 18, 1985 comments to the BLM (Enclosure 3), an additional measure should be adopted. This measure entails prohibiting the construction of air strips and heliports within Area 2.

2. For the purpose of clarity, the fifth protective measure should be combined with the first measure to read:

> "Fill or excavation, including gravel extraction, would be allowed only in Class I wetlands and upland habitats. No fill or excavation would be allowed within Class II - VIII wetlands."

3. To avoid potential confusion, the seventh protective measure should be modified as follows:

> "Facilities essential to the production and transportation of oil from Area 2 will be permitted in Class I wetlands and upland habitats. Prohibit non-essential facilities with a high level of disturbance or pollution risk."

Pages 52 and 53, Area 3 Waterbird Protective Measures: During Phase 1 of the TLSA, agency representatives also recommended protective measures for Area 3 of the TLSA. These recommendations were discussed at the December 21, 1984, meeting and conveyed to BLM in writing on January 18, 1985 (Enclosure 3). The Waterbird Working Group felt that BLM's existing lease terms and conditions should be applied to Area 3, with certain changes and additions. The Area 3 waterbird protective measures contained in the Draft HE do not reflect many of the recommendations submitted to BLM on January 18. The HE should be revised to incorporate those recommendations.

Pages 63-65, Caribou Protective Measures: It should be emphasized that baseline data on the TH is very limited. Consequently, available information is insufficient to properly manage this caribou herd if development occurs in the TLSA. Although the protective measures outlined in the Draft HE generally represent a good initial approach to minimizing adverse impacts to the TH, developing a sound habitat management plan for the herd is not currently possible. We request that this point be specifically addressed in the final HE, in addition to the following revisions:

1. Protective Measures for Area 2 (Caribou Insect Relief Habitat):

   a. For the purpose of clarity, we recommend that the fourth measure be revised as indicated below:

   > "Require aircraft to maintain an altitude of 1,000 ft. AGL [year-round] from August 1 to June 30 and 2,000 ft AGL from July 1 to July 31 over areas designated as insect relief (Figure 15)."

   b. The third protective measure states that no permanent facilities would be allowed in designated caribou insect relief habitat. However, the fifth measure states that airports and heliports would be allowed, if sitting these facilities in insect relief areas was environmentally preferable. These measures appear somewhat contradictory, and should be clarified.

Pages 97 and 98, Subsistence Protective Measures: The general protective measures outlined on pages 97 and 98 provide a good initial approach to minimizing potential adverse effects of industrial development on subsistence harvest activities. However, as stated in the Draft HE, additional subsistence land use information for the TLSA will likely be available in the near future. Management of the TLSA should, therefore, be flexible to accommodate revisions to the protective measures, if warranted.

Pages 99-101, Zone 1 Protective Measures: The ADF&G Phase 1 participants request that the fourth protective measure for Zone 1 be revised. As currently written, this measure requires that aircraft avoid flying over Zone 1 or maintain an altitude of 5,000 feet, except for Camp Lonely and authorized scientific studies. This language implies that aircraft going to and from Camp Lonely do not have to comply with this restriction. The ADF&G Phase 1 participants do not agree with this exception. Safety permitting, aircraft going to and from Camp Lonely should also be required to comply with this standard, with the exception of take-offs and landings. The fourth protective measure should be modified as follows:

> "Require aircraft to avoid flying over the area or maintain an altitude of 5,000 feet AGL from May 1 to September 30 and prohibit aircraft landings, except for landings and take-offs at Camp Lonely and for authorized scientific studies. [during the same time period.] Flight corridors may have to be established to [eliminate] minimize impacts to waterbirds."

Pages 101 - 102, Zone 2 Protective Measures: Consistent with previous Phase 1 participant comments on the waterbird protective measures, it is essential for Phase 2 and 3 decision-makers to understand that oil and gas development in the high density swan and duck habitats included in Zone 2 will likely result in adverse impacts to these species. Phase 1 participants, therefore, felt that deletion of Zone 2 from leasing was the preferable management option. Similar to the waterbird section, this is implied in the Chapter 3 discussion of Zone 2, but it is not clearly stated. Because of the importance of this point, we would like to reiterate our request that Phase 2 and 3 participants be made fully aware of this recommendation.

The Chapter 3 discussion of Zone 2 protective measures should also be modified to reflect the revisions recommended for the waterbird Area 2 measures. These revisions include:

1. Combining the first and fifth protective measures as follows:

   > "Fill or excavation, including gravel extraction, would be allowed only in Class I wetlands and upland habitats. No fill or excavation would be allowed within Class II - VIII wetlands."

2. Modifying the seventh protective measure, as indicated below:

   > "Facilities essential to the production and transportation of oil from Zone 2 will be permitted in Class I wetlands and upland habitats. Prohibit nonessential facilities with a high level of disturbance or pollution risk."

Pages 102 - 103, Zone 3 Protective Measures: As previously discussed, on January 18, 1985, the Waterbird Working Group recommended protective measures for Zone 3 of the Special Area (Enclosure 3). It was the consensus of the ADF&G and USFWS participants that the BLM's existing lease terms and conditions should be applied to Zone 3, with certain changes and additions. The Zone 3 protective measures do not reflect many of the recommendations submitted to the BLM. The ADF&G Phase 1 participants request that the HE be revised to incorporate those recommendations.

ab8507010lrad

BEST COPY AVAILABLE

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

BILL SHEFFIELD, GOVERNOR

344-0541
333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99502

January 18, 1985

Layne Adams
Bureau of Land Management
Fairbanks District Office
P.O. Box 1150
Fairbanks, AK 99707

Dear Mr. Adams:

Re: Waterbird Distribution and Recommended Lease Conditions for the Teshekpuk Lake Special Management Area

Enclosed you will find a copy of the waterbird distribution and life function map (Enclosure 1) which the waterfowl working group gave you on December 19, 1984. This map is based on comprehensive waterbird surveys conducted since 1977. The information on this map is considered a conservative representation of waterbird usage because a greater area (depicted by the red line) is used in some years, particularly when large numbers of waterbirds are displaced from prairie nesting areas by drought. The map has been subdivided into three zones based on waterbird usage and life function, and the best available information on their sensitivity to changes in land use. To maintain continued usage of the Teshekpuk Lake area by present numbers of molting and staging black brant, white fronted geese, as well as other species, the waterbird working group makes the following recommendations:

Zone One: Zone One is delineated by the bold red line and roughly includes all of the area north of Teshekpuk Lake. This zone contains the highest black brant molting and staging areas, and molting, staging, and nesting areas for large numbers of other geese, ducks, and tundra swans. This area should be managed to conserve the important wildlife populations using this unique area. Because of the demonstrated incompatibility of even low levels of human activity with black brant and other geese molting and staging; and duck, goose, and swan nesting; no portion of Zone One should be leased. This area should be retained in public ownership, and no permanent facilities (e.g. roads, air fields, power lines, etc.) should be permitted. Temporary activities which do not disturb or pollute the land's surface may be allowed during the period October 1

through April 30, but not during the summer. The Bureau of Land Management (BLM) should attempt to acquire private lands within Zone One through trades or purchase. In addition, the aircraft overflight recommendation noted under Zone Two (no. 5) would also apply to Zone One.

Zone Two: Zone Two includes portions of the high-density brant staging; goose nesting, molting, and staging; tundra swan nesting, molting, and staging; and high-density duck habitat which falls outside of Zone One.

Oil and gas leasing, exploration, development, and production in this area would result in declines in the number of waterbirds using these areas through habitat loss and disturbance. However, if leasing is a high priority in these areas, the following measures would minimize impacts:

1. Surface entry is permitted, but
    a. No fill or excavation would be allowed in Class II-VIII wetlands (See Bergman et al. (1977) for characterization of these wetland types).
    b. Construction of roads, pads, and facilities would only be allowed between October 1 and April 30. Routine maintenance, production, and transportation would be allowed year around.
    c. Local service roads and corridors would be permitted. Regional transportation or utility corridors would not be permitted.
    d. No air strips or heliports would be permitted.
    e. No gravel extraction would be allowed.
2. No permanent roads or facilities would be constructed during the exploratory phase.
3. Facilities essential to the production and transportation of oil from Zone Two would be permitted. Non-essential facilities with a high level of disturbance or pollution risk would be located outside of Zone Two.
4. In the construction of roads, pipelines, pads, and other facilities, the identification and maintenance of existing drainage patterns would be required.
5. Aircraft will maintain an altitude of 1,500 feet elevation when flying over Zone Two during the period May 1 through September 30.

6. All of the BLM's existing biological and cultural lease terms and conditions, as described in your November 29, 1984 memorandum number 1-08 (290) would apply with the changes and additions shown in Enclosures 2 and 3.

Zone Three: Zone Three includes the remaining portion of the Teshekpuk Lake Special Management Area. This area could be leased under the terms and conditions described previously in Number 6, with the changes and additions we recommended. These terms and conditions should apply to all phases of exploration and development, not just the exploratory phase.

Both the state and federal members of the waterbird working group are under the impression that the BLM is going to prepare a formal land use plan for the Teshekpuk Lake Special Management Area prior to making any land use decisions. It is also our understanding that any subsequent land management decisions, including the decision to lease for oil and gas, will be based upon that plan. The commitment to prepare a land use plan and to base all land use decisions on that plan is the cornerstone of both the state and federal Memorandums of Understanding on the Teshekpuk Lake Special Area (Enclosures 4 and 5). However, it is not clear that the Habitat Management Plan (HMP) will be developed into a formal BLM land use plan, or that land use decisions will be deferred until after the plan is completed.

Because of the importance of salt and freshwater wetlands in the Teshekpuk Lake ecosystem it is essential that the BLM (1) identify and map the wetland types, and (2) identify and map fresh and salt water drainage patterns in the area in addition to the ongoing data collection process for the HMP. To successfully conserve this important wetland habitat, it is necessary to know where the productive habitat is, and how it is maintained.

The HMP should also contain a provision that in the event a discovery is made, a field-wide mitigation plan would be developed which would address the cumulative impacts of all the activities, facilities, and land use changes necessary to develop the field (see Enclosure 3, number 10). This would be prepared concurrently with the development unit agreement, and the operator would be required to submit a best reasonable estimate of the number, location, and life expectancy of facilities, etc., necessary to develop the field. This would be overlaid over the HMP wildlife maps and potential conflicts between proposed facilities and such things as caribou migration routes and productive wetlands would be identified. Data gaps would also be noted. A mitigation plan would then be prepared cooperatively by the

The waterbird distribution and life function map referred to as enclosure 1, in the January 18, 1985 letter, is represented by Figure 25 (Recommendations) and Map 2, Appendix VI (Biological Data).

NORTH SLOPE BOROUGH
OFFICE OF THE MAYOR
P.O. Box 69
Barrow, Alaska 99723

Phone: 907-852-2611

George N. Ahmaogak, Sr., Mayor

July 19, 1985

BLM AK-020
JUL 22 2 08 PM '85

Mr. Jim Silva
Lead Habitat Evaluation
Bureau of Land Management
Fairbanks District
1541 Gaffney Road
Fairbanks, Alaska 99703

Subject: Draft Habitat Evaluation Plan

Dear Mr. Silva:

The North Slope Borough has looked into the Draft Habitat Evaluation Plan and have no comment at this time. Since the staff of the Environmental & Conservation Office of the North Slope Borough helped in the collection of data and participated in the public hearings, we feel that the study is complete and will help us in making decisions concerning the Teshekpuk Lake Area.

I am looking forward to the meetings to be held in October at Anchorage to discuss the results from the Draft Report. If you have any questions or changes in dates, please contact Sandra McCloskey at our Anchorage Liaison Office. Their phone number is (907) 561-5144.

Thank you for your cooperation in the Teshekpuk Lake Study and we hope to work with you in future projects that may affect the North Slope Borough.

Sincerely,

George N. Ahmaogak, Sr.

George N. Ahmaogak, Sr.
Mayor

CITY OF BARROW

[illegible]
BOX 629
BARROW, ALASKA 99723
PHONE (907) 852-5211

July 19, 1985

Mr. Jack C. Mellor, Project Manager
Bureau of Land Management
Fairbanks District Office
P.O. Box 1150
Fairbanks, Alaska 99707

Re: Draft Habitat Evaluation Teshekpuk Lake Special Area Study

Dear Mr. Mellor:

Please find attached to this correspondence the comments of the City of Barrow upon BLM's Draft Habitat Evaluation of the Teshekpuk Lake Special Area in the National Petroleum Reserve - Alaska. What follows in this cover letter is a brief summary and a few additional remarks.

The Barrow City Council sponsored two town meetings on the Teshekpuk Lake leasing issue on June 11 and June 27, 1985. The enclosed comments are based entirely upon the testimony of the people who came to the meetings and upon interviews conducted with elders of the community by Helen Simmonds, who volunteered her time as an interested citizen. (see "Acknowledgements" at close of comments).

Nearly all of the people who contributed information are subsistence users of the Teshekpuk Lake area. At each of the three occasions the four maps of Appendix V to the Habitat Evaluation were available and were referred to frequently. At the June 27 meeting and the interviews, the oil potential map (figure 3 of the mineral evaluation) was available as well. As you will see from the comments, most participants indicated that the Teshekpuk Lake area is an extremely rich and valuable source of food and oppose oil development in the area, many pointing out that subsistence needs will be increasing as North Slope Borough building programs end and as development declines. (this is borne out in the recommendations made by the village round table group of the North Slope Borough Private Sector Economic Development Conference held July 10 and 11 of this year. It is my understanding that these recommendations will be available from the North Slope Borough Planning Department shortly).

In our last phone conversation I mentioned testimony concerning recent fish kills from river drainage. In reviewing the testimony, it appears that the comments referred to the Sagavanirktok River damage which occurred during Prudhoe Bay development. You indicated that the methods which caused the fisheries damage at Prudhoe is now disapproved.

Letter to BLM - Teshekpuk Lake
July 19, 1985
Page two

However, neither the Habitat Evaluation nor preferred alternative C of the Record of Decision indicate any specific prohibition against pumping water from rivers and lakes. Although the problem of water loss is recognized and 200 meter - from - water course prohibition may occur . under Alternative C, there does not appear to be sufficient protection to meet the concerns of witnesses and address this known environmental danger.

As you will see from the attached comments fishing is critical to the subsistence users of Teshekpuk Lake and many people felt that development activity would likely cause irreparable harm to the fish which is caught in great variety and amount in every lake and water course in the Teshekpuk area.

Based upon the testimony on the importance of Teshekpuk Lake for subsistence, it is a matter of grave concern that the State Director has chosen in the May, 1983 Record of Decision Alternative C which deletes only the black brant molting area above Teshekpuk Lake. Alternative C leaves to the industry some of the responsibility for determining adverse impact of oil development and seems to assume that a list of stipulations will protect subsistence and habitat adequately. While it is clear that the Draft Habitat Evaluation was written with Alternative C in mind, Alternative B, involving the deletion of the whole area from leasing would seem the most appropriate, since it minimizes the threat to subsistence (Alternative C refers to the threat to subsistence as "balanced", ROD at 17) and would require more weight to be given to the value of subsistence use.

I cannot emphasize enough the importance placed by the participants in the city's meetings on Teshekpuk Lake as a rich and essential source of subsistence food for the Barrow community, and the strength of the feeling that it should not be developed. As one person said, "Teshekpuk Lake is the community's garden".

Please keep us advise of BLM actions in this matter.

Thank you for your consideration and patience in awaiting these comments.

Sincerely,

Kathleen Strasbaugh

Kathleen Strasbaugh
City Attorney for
Marie Adams, City Manager

cc: Citizen participants
Mayor George Ahmaogak, NSB

CITY OF BARROW

(northern-most incorporated city)
BOX 629
BARROW, ALASKA 99723
PHONE (907) 852-5211

COMMENTS OF THE CITY OF BARROW, ALASKA
BLM DRAFT HABITAT EVALUATION FOR THE TESHEKPUK LAKE AREA

I. INTRODUCTION

The City of Barrow sponsored two town meetings in June, 1985 concerning subsistence use of the Teshekpuk Lake area. In addition, a citizen volunteer, Helen Simmonds, interviewed elders of the community at the Barrow Senior Center. The comments set forth below are based upon the testimony of participants at all three meetings.

II. HABITAT IDENTIFICATION AND IMPACT

Many of the meetings' participants provided information on habitat based upon their close familiarity with the area which should be noted in the habitat section of the Draft.

A. BIRDS

Subsistence users identified bird nesting areas additional to those listed in the Draft Habitat Evaluation, in the northeast, east, and southeast sections of the area. Eggeries are plentiful on the south shore of the Lake and at its northeast corner (Zone 2 on the land status map, not currently deleted). Witnesses indicated that some birds nest in the fall, calling into question the adequacy of seasonal restrictions as a means of protecting the birds' habitat.

Several who testified have observed first hand at Prudhoe Bay or in the Kuparuk area that development results in far-reaching effects upon birds. Smoke and dust from routine development activities such as road and gravel pad construction in both areas have caused birds to leave nesting grounds which are quite distant from the development area, justifying the concern that even modest development activity will affect nesting in the area if only Zone 1 is eliminated from development.[1]

B. CARIBOU

Caribou calves are seen throughout the Teshekpuk Lake area. The southeast corner of the Lake is a significant calving area, for example.(This corner is in Zone 2 of the Land Status map, not currently slated for deletion.)Others testified that insect relief areas for caribou are far more widespread than indicated on the caribou map.

Some noted that sand and gravel fills in the Prudhoe area have disturbed caribou grazing and travel areas and that the monitoring which is supposed to detect and correct these effects has been inadequate, calling into question the ability of the developers to protect the caribou in the Teshekpuk Lake area, considered more sensitive than the Prudhoe area. Witness Jonah Tukle, conversant with the Nuiqsut area as well as Teshekpuk Lake, observed that caribou cannot get over, under, or around pipelines to follow their natural routes and that Nuiqsut hunters are unable to get to the caribou because of the same obstructions. Hunters are also denied access to their traditional hunting areas by developers. Development in the Teshekpuk Lake area is likely to have the same result.

Finally, most participants testified that caribou were in the area year round, raising questions about whether any stipulations will prevent disturbance of caribou calving and movement through the area.

III. SUBSISTENCE USE AND IMPACT

The citizens testifying made it clear that the Teshekpuk Lake area is one of the richest used by Barrow residents,and the best source of fish.

A. FISHING

Subsistence fishing appears to occur in every lake and watercourse in the Teshekpuk Lake area. Great Varieties of fish are available. Historically as well as currently the Teshekpuk Lake area is known as the best fishing spot for the people of Barrow. Fishing occurs at freeze up as well as during the summer months.

The citizens who testified are thus concerned about the effects of development on water quality and availability known to have occured in other areas such as Prudhoe Bay. Two participants had direct experience in the oil fields which heightens their concern. Mr. David Leavitt saw first hand the damage caused by the drainage of the Sagavanirtok River and the resultant fish kill. Mr. Charles Edwardsen, Sr. observed chemical contamination of watercourses from material used routinely in oil development and of the springtime seepage of contaminants buried in the winter which poisoned water and vegetation. Other witnesses expressed concern about food quality of fish disturbed by seismic exploration activity or airplane landings on lakes. It would seem that none of the watercourses in the area could be used for development activity without affecting the fish,and thus the most critical subsistence use of the area. For many citizens of Barrow, the Teshekpuk Lake area, especially Zones 2 and 3 which the Draft does not recommend the level of protection suggested for Zone 1 (the black brant molting area), is not only the third largest lake in Alaska, but supports the most abundant supply and variety of fish known to the Inupiat people of the North Slope, currently as well as historically. It does not appear that the Draft Habitat Evaluation gives this aspect of subsistence value sufficient weight because the concession at page 61 of the Draft that water contamination is a serious concern carries with it no suggestion of deletion or any mitigation measures which could reasonably be expected to prevent fisheries loss.

C. CARIBOU HUNTING AND OTHER SUBSISTENCE USES

Older people who testified indicated that caribou hunting in the area is a somewhat recent development but that it is now a prime caribou hunting area, all year round and throughout the entire area.

Trapping and geese hunting were mentioned by more than one witness as current uses of the area as well.

D. GEOGRAPHIC CONSIDERATIONS

While most who testified indicated that they and other subsistence users travelled throughout the area, Zone 3, for which the draft suggests the least protection, was mentioned what frequently by those who used the maps to identify an area where they spent the most time. Any final evaluation should be revised to note the high subsistence value of the non-deleted areas.

---

[1] According to participant Arnold Brower, Jr., the North Slope Borough has studied this problem.

The elders who gave interviews indicated that their families had over the years moved from place to place in the Teshekpuk area, building new temporary shelters in areas where the game was better. The tradition clearly continues, according to the testimony of younger users.

Another serious concern expressed frequently by those present was that development would restrict free access to the area, especially in view of the fact that the people move frequently from one hunting or fishing spot to another. Access methods listed included plane, helicopter, and snow machine.

Allotment holders indicated concern about interference with rights of way to their allotments. Allotment holders like Edna Leavitt and Mary Edwardsen testified that their rights of way would be shared with other subsistence users in the area, and felt that the restrictions which are likely to be imposed by developers would seriously reduce the subsistence value of their holdings.

V. DEPENDENCE ON SUBSISTENCE

Dependence on the Teshekpuk Lake area for subsistence needs is not only historically but also currently significant, not only for the people who go there but for the extended families and elders who eat the food when it is brought home to Barrow. Elders interviewed indicated that 60-95% of their diets were from subsistence food and that 40-95% of that food was from the Teshekpuk Lake area. This was true even for those who were no longer able to get out to those or other hunting and fishing sites themselves. Elders indicated that they received food from friends and relatives who currently hunt in the area fairly regularly. The elders frequently mentioned that Teshekpuk Lake is a prominent part of traditional lore about good hunting and fishing spots, and has been from time immemorial. Time and again the participants stated that use of the area was year round.

Most of those who testified expressed great concern that the area not be ruined for their children and grandchildren, who will have to rely upon subsistence when the oil money is gone. It should also be noted that an immediate increased need for subsistence food was expressed by many young adults who are experiencing at this moment the reduction of jobs in Barrow as a result of severe cutbacks in North Slope Borough capital projects.

While the Draft [illegible] the concern about the future on the part of subsistence hunters, it must be stated that with respect to the return to subsistence, opportunities to earn cash are declining in the immediate present. Development of Teshekpuk Lake, given the damage anticipated by the witnesses and reviewed in the Draft, poses a direct economic threat to people who are dependent on subsistence, as well as to the traditional subsistence way of life.

As witness Marie L. Simmonds put it, "Teshekpuk Lake is our garden".

IV. GENERAL CONCERNS AND RECOMMENDATIONS

A. RECOMMENDATIONS

Witnesses Joash Tukle, Alfred Leavitt, Baxter Adams, Daniel Leavitt, and Charles Edwardsen, Sr. recommended strongly that if there is to be any development in the area that any pipeline be buried, and that if pipelines cannot be buried, alternate overland and buried pipe systems should be considered.

Witnesses also recommended that no lakes, rivers, or streams containing fish be used as a source of water for operations; fish circulate throughout the area and damage to one watercourse could easily affect fishing in the others. Participants also strongly opposed development in additional bird nesting areas identified during the course of the meetings. Further study of the area's fisheries was recommended before any decision about development is made.

B. CONCERNS

Despite the recommendations listed above, virtually all of the participants opposed oil development on the Teshekpuk Lake area. Many expressed a fear that their opinions would not be given the consideration they deserve, even though their knowledge of the area is superior to that of government and industry staff, in view of the fact that much development of the North Slope has occured despite similar concerns. Mr. Wesley Aiken testified that opposition to development in the area was opposed as long as ten years ago on the same grounds yet the area is still being considered for development. Bertha Leavitt and Ida Olemaun indicated that people were discouraged about giving testimony and attending hearings because it seems that citizen concerns are largely ignored. Ms. Olemaun stated that the people's priorities were subsistence first, habitat second, and oil development last. (These priorities are apparently the reverse of those of the Record of Decision.) The people of Barrow have seen what has happened elsewhere - recently at Prudhoe Bay and Kuparuk and earlier in the '40's- and stated unequivocally that the cost of the possible benefits of development are not justifiable in this valuable subsistence area. The use of the area is communal, and those who wait at home for food as well as the hunters themselves believe, with good reason, that their food supply and way of life are threatened by this development. Teshekpuk Lake is viewed by many as the last best area for hunting and fishing at a time when the need for subsistence food is increasing. The people who testified called for BLM to leave Teshekpuk Lake as it is, free of development. As Mr. Howard Leavitt put it:

> . . . Even if they hit it big with oil in Teshekpuk Lake our government will use the monies for other uses than meeting our local needs. It is evident they will not leave us space to do our hunting, there will not be any small lakes surrounding the Teshekpuk Lake, what do they care about these small lakes, they will run them dry and leave. They will kill our fish livelihood permanently. I concur with the protest of the Inupiaq people testifying against drilling for oil in this area. I testify against the drilling of oil in the Teshekpuk Lake area vehemently. I grew up in the Teshekpuk Lake area and fish are plentiful around the lake and its tributaries. If the oil is drilled there, where will the people have the fishing spot in the North Slope? There is no other place to fish but there. It was our only livelihood when I was growing up; the shores of the lake are indeed full of fish of many kinds. I would like to assist the people who are making documents in this matter. It is part of our Inupiat diet to have whitefish or annaqtik but if the lakes are dry, how can we nourish our diet?[2]

---

[2] Interview by Helen Simmonds; translation by Emily Nusunginya.

The strength of the expressions of concern by all the participants finds support in the technical data reviewed in the draft as well as the specific information obtained at the hearings from subsistence users. At pages 76 through 79 of the Draft, year round use and movement throughout the area is acknowledged, as is the potentially enormous damage to water resources which could result from oil operations. Other conclusions of the Draft are clearly incorrect. The testimony contradicts the assertion that human use is limited (see Draft at 11) and that there is a lack of interest in the proceedings (cf. Draft at 93).

It appears that seasonal restriction will not be adequate to protect winter hunting, fishing at freeze-up, year round caribou travel, and an adequate supply of water. Likewise it is hard to imagine exploration and development without water use, and contamination and water supply draw down are primary concerns of subsistence users which are not adequately provided for in the Draft.

It is clear from the testimony that there is a large fund of information about habitat and subsistence use among the citizens of Barrow which has not been tapped by the investigations conducted by BLM. The subsistence use may be the greatest in the areas recommended for the least protection, and the habitats of wildlife of greatest concern in the draft are more widely dispersed than the Draft indicated.

The opposition to development expressed by the citizens who participated in these comments is not borne of abstract concern; witnesses gave specific information showing that the Teshekpuk Lake area involves a vast network of communal

subsistence uses and an interconnection of habitat and subsistence values, especially in the watercourses, the contamination or damage to any one of which will cause harm to the others.

V. SUMMARY

Based upon the importance of the Teshekpuk Lake area to the Inupiat community of Barrow's subsistence, the City of Barrow opposes oil leasing and attendant exploration in the area. More specifically, it is urged that the Draft be revised to acknowledge that seasonal and other limitations will not adequately protect the habitat and subsistence values evident from the testimony summarized above.

* * * * * * * * * * * * * * * *

Acknowledgements

The City of Barrow thanks the following people for their participation in the meetings and their contribution to these comments:

Baxter Adams
Wesley Aiken
Arnold Brower, Jr.
Jane Brower
Charlie Edwardsen, Sr.
Mary Edwardsen
Dora Elavgak
Joseph Elavgak
Leffingwell Ericklook
Levi Greist
Mary Itta
Loretta Kenton
Ernest Kignak
Chester Lampe, Sr.
Alfred Leavitt
Bertha Leavitt
Daniel Leavitt
David Leavitt
Herbert Leavitt
Howard Leavitt
Jonah Leavitt
Arthur Neakok
Jean Numnik
Ben Nungasuk
Emily Nusunginya
Faye Nusunginya
Ida Olemaun
Helen Simmonds
Marie L. Simmonds
James Toovak
Kenneth Toovak, Sr.
Joash Tukle
Richard Ungarook

Alaska Oil and Gas Association

AOGA

505 W. Northern Lights Boulevard
Suite 219
Anchorage, Alaska 99503
(907) 272-1481

June 3, 1985

Mr. Jim Silva
Bureau of Land Management
P. O. Box 1150
Fairbanks, Alaska 99707

Teshekpuk Lake Special Area Study Habitat Evaluation Comments

Dear Mr. Jim Silva:

The Alaska Oil and Gas Association (AOGA) is a trade association whose members companies account for the majority of oil and gas exploration, production and transportation activities in Alaska. AOGA appreciates this opportunity to submit comments on the subject plan. We have a few general comments highlighted below in addition to the detailed comments enclosed.

We are concerned that the Habitat Evaluation recommends significant unjustified stipulations. These unjustified stipulations would impact leasing, render marginal fields uneconomic, and could preclude development of large discoveries. As an example, we note that the evaluation proposes to restrict all activities to winter months in Zone 1. Since production operations cannot be operated "seasonally", this stipulation would prevent any field development within that zone. Such restrictions are excessive and unnecessary. Our exploration and production experience on the North Slope proves that operating oil and gas facilities and wildlife do coexist successfully without many of the suggested stipulations.

The assumptions of impacts detailed in the evaluation are not supported by existing research. It seems the authors have selectively utilized the literature and relied excessively on individuals' opinions to build a case for preservation of this area. A large body of literature which was furnished to the BLM during the development of the evaluation refutes claims that significant impacts will occur to the caribou and waterfowl populations. Too much use of personal communication references have been made in this report. We ask that the BLM consider all the information submitted and that the use of personal communication references be kept to a minimum.

It appears that BLM intends to impose severe restrictions on any further oil and gas activity in the Teshekpuk Lake Special Area (TLSA). In the case of existing valid leases within the area, this would amount to retroactive lease stipulations, or the one-sided alteration of an existing contract by BLM against the will of the other party to the contract.

The pipeline routes depicted in the mineral assessment are very unrealistic. The assumption is made that a pipeline "would probably follow an offshore route and not make a landfall until near Kuparuk or Prudhoe Bay oil fields...". This is a premature and possibly incorrect assumption. At present, such an extended offshore route would test the limits of technology, as no submarine pipelines have yet been laid in the Beaufort Sea. We suggest that a more realistic base case scenario would be to come ashore as soon as possible with a pipeline and route it easterly onshore through the Teshekpuk Area.

The stipulations utilized for past NPR-A leases are very restrictive and more than sufficient to mitigate impacts in a potential Teshekpuk Area lease sale. AOGA is very concerned that the unjustified stipulations proposed are so onerous that they could preclude future leasing.

Very truly yours,

WWHopkins

WILLIAM W. HOPKINS
Executive Director

WWH:tp7:726

Enclosure

ALASKA OIL AND GAS ASSOCIATION
DETAILED COMMENTS ON
TESHEKPUK LAKE SPECIAL AREA STUDY
HABITAT EVALUATION

Page 4, Objective 2

Based on this wording it would seem that any habitat where caribou occur would be considered crucial. In fact, for caribou, there may be no crucial habitat, but more simply a range where all of their activities occur in different places and times.

Page 6, ROD Conditions

The first condition can be satisfied since development facilities would disturb only a very small percentage of the land within the Special Management Zone. The second condition has been satisfied since the multiple studies in Kuparuk, Prudhoe, and Lisburne have demonstrated a high degree of compatibility for caribou calving and brant molting with oil field development. If oil resources exist, development can occur without significant impact to these environmental resources even in the vicinity of a development.

Page 12-17

This listing of birds is not specific to the area. The same birds are found in the Prudhoe/Kuparuk/Lisburne and other North Slope coastal areas.

Page 20, Molting Black Brant

The Black Brant nests and molts within the Prudhoe Bay oilfield. Two years of research in the Lisburne Development area (around the east, north and west edge of Prudhoe Bay) by Woodward-Clyde Consultants revealed the following:

- during 1983 and 1984, 20-28 brant pairs nested as a group 1500 feet from an active storage pad and a test pad for the Lisburne Project.
- Brant molted and brooded in the Lisburne Development area. A popular molting/breeding area was in the mouth of the Putuligayuk River 1000 feet from West Dock road - one of the busiest roads in the oilfield.
- More Brant molted and brooded in this area than nested, showing that Brant actually moved into the oilfield to molt after nesting elsewhere.

See the enclosed 1983 Lisburne Report which documents waterfowl nesting within a developing area. The following is from that report.

Lisburne Development Area

1983

NESTING

	No. Nests	Nest Density	Nesting Distance from Facilities
Canada Goose	19	0.3 nests/km^2	80-2260m, $\bar{x}$=903
White-front Goose	3	0.06 nests/km^2	30-90m, $\bar{x}$=50
Brant	20	0.4 nests/km^2	440-580m, $\bar{x}$=520
Tundra Swan	6	0.1 nests/km^2	190-2610m, $\bar{x}$=1410
Ducks	None		
Arctic Loon	15		80-1800m, $\bar{x}$=727
Glaucous Gull	6		55-670m, $\bar{x}$=356
Red-throated Loon	9		170-590m, $\bar{x}$=310
Arctic Tern	1		340m
Sabine's Gull	3		370m
Parasitic Jaeger	2		190-720m, $\bar{x}$=455

Brood Rearing	No. Adults	No. of Young	No. of Broods
Canada Goose	84	193	38
White Front Goose	10	29	5
Brant	41	45	
Snow Goose	10	28	

Major brood rearing areas ranged from 15-980m from the nearest existing major oil field facility. The total Lisburne Area is only 53 km^2.

Page 21, (3)

Actual mortality caused by egg removal and killing of molting birds seems a more real threat than unsubstantiated concern over disturbance. Please note the attached Woodward Clyde memo from Mike Joyce to ARCO relating many observations of ducks and geese and their reactions in the presence of various disturbances.

Page 29, Second Complete Paragraph, Second Sentence

Surveys of snow geese on Howe Island do not indicate that this colony is declining. The island was not used for nesting in 1977, and numbers were reduced in 1977 and 1978. However, the geese returned the following year and have used the island in increasing numbers since then.

Actually the breeding colony has grown beyond the pre-disturbance levels in spite of oilfield development. See below:

Year	No. Goslings	No. of Snow Geese-Howe and Duck Island Sag Delta
1971	107	207
1972	152	274
1973	131	257
1974	14	132
1975	42	120
1976	32	110
1977	35	80
1978	21	53
1979	35	103
1980	100	181
1981	234	413
1982	45	206
1983		583
1984		423

These numbers are from LGL, Ltd. who have been studying this snow goose colony intensively for the last 5 years.

Page 30, Item (2) (a), Second Paragraph

Perhaps it can be described how the Howe Island breeding colony is threatened?

Page 32, First Paragraph

Please delete the statement, "It is highly unlikely that snow geese will nest in any significant numbers if oil and gas-related activities occur in the area." Snow geese exist in the vicinity of the Prudhoe Bay, Lisburne and Endicott developments.

Page 34, No. 4 (Sensitivity to Impact) a.(1)(a)

The authors state "There may be some effects on the vegetation mat [from winter cross-country transportation], and although the effects are thought to be minimal..., long-term effects on wetland habitats are not completely understood." Given the fact that oil and gas exploration operations have been conducted in this region since 1949, it would appear that a wealth of data is available on the long term effects on wetlands, at least for the past 36 years. We suggest that 36 years should be considered a long-term period of time, and that old activity effects are as understood now as they ever will be.

Again, on Page 35, same heading, we read "Improper cross-country travel can have a myriad of effects and examples of past adverse impacts exist throughout the North Slope." Apparently BLM considers any impacts on wetlands from vehicular traffic as adverse, although it is our impression that probably 90% of this adversity is visual and esthetic, rather than physically harmful. Certainly natural physical processes duplicate and usually far surpass the effects of travel, but the difference is that nature doesn't as often operate in straight lines or parallel tracks. We suggest that the biological population of the North Slope is perfectly at ease with and thriving within these "past adverse impacts" areas.

Page 35 (b), Exploratory Drilling

The second paragraph makes many unjustified remarks by exaggerating the potential extent of contamination around drill sites, and resultant impacts on wildlife. These statements of effect should be documented or removed from this report. Further drilling muds are casually lumped together with other "toxic substances" which may contaminate wetlands. Drilling muds should not be referred to as toxic substances. Sometimes additives are used which can increase the very low toxicity of muds, but even in this case, toxicity remains low in comparison to most any other form of waste. Also please recognize that the State is putting together onshore mud disposal guidelines and will be carefully regulating such wastes.

Page 36, Second Paragraph

The last part of the last sentence beginning with "but" should be removed as it is strictly an opinion.

Page 37, First Paragraph

In the first sentence it is stated that it is difficult to predict effects on waterbirds and their habitats from placement of an oil production facility, yet the paragraph concludes that development is "unacceptable when weighed against the almost certain displacement of molting geese." We disagree that displacement of geese is even likely, much less certain. The statement should be deleted or a basis should be provided.

Page 37, Fourth Paragraph, Line 6

This could be important only if this type of habitat were limited on the North Slope.

Page 37, Fifth Paragraph

Coastal wetlands (salt marshes) could be maintained with large-scale development. This could be accomplished by placing roads near and perpendicular to the coast, and by spacing of the facilities or a number of other means.

Page 38, First Line

Forty-five square miles is just slightly less than the areal extent of the entire Prudhoe Bay field. Any current areal photographs of the field, the largest of its kind, will show that the majority of the field is not covered with chronic impoundments. This unsupportable assertion should be deleted.

Page 38, Third Paragraph

To our knowledge, it has never been substantiated that black brant were disturbed by overflights at Izembek Lagoon which maintained an altitude of 1500 feet or more.

Page 40, Second Paragraph, Second Sentence

The 5,000 foot minimum flight altitude appears to be arbitrary. A basis for this altitude should be provided.

Page 40, Item b, First Paragraph

In many cases it is not practical or feasible to complete construction activities during the winter months.

Page 40, Item b, Second Paragraph

We question whether the noise generated by the gas compressor simulator is indicative of noise generated by oil field facilities. Please note the attached Woodward Clyde Report.

Page 40, Item (3), First Paragraph

It should be noted that the small oil drilling mud and fuel spills are cleaned up and disposed of in such a manner that they do not enter the environment. This section is not representative of even typical lower 48 operations. Certainly, any activity on the North Slope in a sensitive area such as lands around Teshekpuk Lake would be conducted with maximum environmental care. Please revise this misrepresentative discussion.

Page 41, First Complete Paragraph

Even without regulatory controls reserve pits have typically been designed so that these pollution problems would not occur. Under the current permitting/regulatory framework, pollution problems will be mitigated.

Page 41, Second Complete Paragraph

If the U.S. Fish and Wildlife Service has extensively studied reserve pit fluids on the tundra, a personal communication citation should not be used. Further, the discharges spoken of here were to the tundra and constituted only minor exceedences of Alaska Department of Environmental Conservation permit limitations. This activity does not indicate statistically or otherwise that toxicity problems are likely with waterbirds.

Page 41, Fourth Complete Paragraph, Last Two Sentences

A reference citing the active transport of contaminants between ponds over one mile apart should be provided or this speculation deleted.

Page 42, Second Paragraph

To our knowledge there are no domestic dogs in the North Slope oilfields. Please delete this paragraph.

Page 42, Third Complete Paragraph

We would like to point out that poaching is currently not a problem, nor is it envisioned to be a problem. The entire discussion of impacts, including this unprecedented concern, should discuss probable or unavoidable impacts, instead of speculating on worst imaginable circumstances or problems.

Page 43, Last Paragraph

(See Comments for Page 37, Fifth Paragraph)

Page 46, Item 6

We agree that the area is important for waterfowl and that rational protection measures should be utilized. However, industry operates compatibly within critical wildlife areas elsewhere, such as in a bird sanctuary on Avery Island in Louisiana, so it is excessive to prohibit oil and gas exploration and production altogether.

Page 51, First Complete Sentence

A reference for this sentence is required.

BEST COPY AVAILABLE

Page 51, Protective Measures

These protective measures are so restrictive that they preclude leasing. Please see our comments for Chapter 3 "Summary of Protective Measures for Combined Values".

Page 52, Fourth Paragraph, Protective Measure

This suggestion makes no sense and appears illogical. Please note our comments on the Summary of Protective Measures.

Page 57, (a)

There needs to be continued emphasis on differences between exploration and development and the differences in impacts regardless of when they occur. An exploration pad in the summer or winter is not a major impact to the environment. Further it is a gross oversimplification to assume the same general impacts for caribou as for waterfowl.

Page 58, Paragraph 1, Last Line, Alteration of Habitats

This should be revised. A developing oilfield is subjected to continuous review by state and federal agencies. Every activity, every piece of gravel placed, requires agency scrutiny and a permit, all serving to reduce impact.

Page 58, Last Paragraph

We do not agree that there would be a direct physical loss of habitat for caribou from gravel roads, pipeline pads, etc. because caribou often use these pads for insect relief.

Page 59, Third Paragraph

The discussion of Caribou calving sensitivity to disturbance should be revised to acknowledge North Slope and TAPS experience. You should cite Valkenburg or Davis who documented observations of successful calving by the Delta Caribou herd during intense disturbance.

Caribou do calve in and adjacent to the Prudhoe and Kuparuk oil-field. In a recent study conducted in the Milne Point vicinity calving caribou stayed about one mile away from the Milne Point road. There is no reason to expect this herd to behave any differently.

Caribou displacement from previously occupied calving areas should not be a significant problem because habitat is not limiting and historical variability in calving areas is documented.

Page 63, Item 3, First Sentence

Fuel and drilling mud spills etc. should not pose a problem for the environment since these spills are cleaned up shortly after they occur.

Page 63, Protective Measures

(See Comments on Chapter 3)

Page 81, (b)

It should be pointed out that the potential for contamination is mitigated by the conditions of the many permits required for oil and gas activities.

Page 99, First Paragraph

Although this paragraph states that the protective measures outlined in this document are the results of carefully documented studies, we would like to point out that much of the documentation identified in this report is in the form of personal communications with various individuals. We suggest that the final draft of this habitat evaluation concentrate on a fair review of all the literature and on improving and expanding department references.

Also, the BLM should adopt the Caribou Mitigation Policy as practiced in the Kuparuk Field (attached). This policy has and is working successfully such that the Central Arctic herd has not been significantly impacted by this large development.

Page 100, Protective Measures for "Zone 1"

As a general observation, Measures 1, 2 & 3 effectively preclude development. Measure 2 would seem to allow some level of geophysical winter operations. However, no exploration would be undertaken by the private sector without some possibility of development, if a discovery should occur.

Stipulation No. 4 A basis for the 5,000 ft. minimum flight altitude should be provided. This is a significant and unjustified operating restriction.

Stipulation No. 5 A basis for the 1,000 ft. minimum flight altitude should be provided or this measure deleted. We do not know of any documented findings which predict negative effects from winter overflights to justify this restriction.

Stipulation No. 6 Except in the immediate vicinity of cabins there appears to be adequate habitat available for both fishing and any imaginable quantity of area for oil and gas activities. This measure is unnecessary since individual permits will consider site-specific needs for buffer zones.

Stipulation No. 7 This stipulation should be eliminated as it is redundant of existing regulations.

Page 101, Protective Measures

As a general observation the zone 2 stipulations would effectively preclude development.

Stipulation No. 1 Fill or excavation in Class II-VIII wetlands should not be precluded since this habitat on the North Slope is not limiting and the Corps of Engineers already has the mandate to ensure adequate protection of the regional environment before allowing such activities.

Stipulation No. 2 This stipulation should be lessened to a recommendation for permitting agencies to require winter construction when feasible and justified. Some activities cannot be practically conducted in winter on the North Slope.

Stipulation No. 3 This stipulation contradicts itself regarding utility corridors. Such corridors can be constructed to cause minimal impacts and should not be prohibited without much further justification than provided in this evaluation.

Stipulation No. 4 This stipulation as with Stipulations 1 through 3, could prohibit development. Safety and/or operating concerns would dictate that permanent air strips or heliports be provided for production operations.

Stipulation No. 5 A basis for the prohibition of gravel extraction must be provided. Impacts could at times be minimized by leaving flexibility to use local gravel sources.

Stipulation No. 7 This stipulation should be eliminated since it is not in the interest of the developer to establish non-essential facilities.

Stipulation Nos. 9 and 10 See comments for **Page 100, Protective Measures for Zone 1**.

Stipulation No. 11 A basis for the ¼ mile restriction should be provided. This is overly conservative and unwarranted.

Stipulation Nos. 12 and 13 These stipulations would preclude the majority of the study area from any activities. Recommendations requiring a ¼ mile setback where feasible and prudent would be more reasonable.

Stipulation No. 14 This stipulation should be eliminated as it is redundant of existing regulations.

Protective Measures, Zone 3 Comments on stipulations for Zone 3 can be found in comments for the protective measures in Zone 1 and 2. We are discouraged that such inflexible and over restrictive measures are being considered for this less utilized zone. From our experience, we believe such measures are entirely unjustified.

Page 103, Study Needs, Item A

We suggest that BLM look at examples in Alaska as well as outside where intensive petroleum development and intense waterfowl use occur. See Avery Island (La.) and Aransas Pass (Tx Gulf Coast).

Page 103, (D), Paragraph 2

The need to study the caribou to this extent indicates, among other things, that caribou habitat varies from year to year such that no specific "crucial" habitat exists.

Page 123-129, Existing Lease Stipulations

These stipulations are far more than necessary to mitigate potential oil and gas impacts. No further stipulations or protective measures are necessary if these existing stipulations remain in place for a Teshekpuk Lease Sale.

TP7:727

ARCO Alaska, Inc.
ARCO Exploration - Alaska Operations
Post Office Box 100360
Anchorage, Alaska 99510-0360
Telephone 907 276-1215

DIS[illegible]CE
FAIRBANKS, ALASKA
JUN 3 3 02 PM '85

May 31, 1985

Mr. Jim Silva
Bureau of Land Management
PO Box 1150
Fairbanks, AK 99707

Dear Mr. Silva:

Teshekpuk Lake Special Area Study
Habitat Evaluation - Draft

ARCO Alaska, Inc., appreciates the opportunity to comment on the subject study. After reviewing said study, we wish to make the following observations and comments:

The introduction of the Habitat Evaluation (HE) states that the HE will identify the "sensitivity of different wildlife species to impacts from oil and gas exploration and development" and the "incompatibilities between subsistence uses and oil and gas activities." With such a basis for the study, the reader is left to assume that the oil and gas industry cannot co-exist with the wildlife or human occupants of this area. Our experience on the North Slope indicates that the oil and gas activity can co-exist with the other "resource users." Therefore, we recommend that more consideration be given to the positive co-existence factors.

There is concern that "access developed for a facility may improve ingress to the area for local subsistence users who harvest birds and collect eggs" (p. 41). Given the sophisticated means of access by subsistence users into the Teshekpuk Lake area (pp. 76-77), it does not seem that additional access afforded by development of a facility is significant enough to warrant mention as a detrimental factor for such development.

The HE contains numerous "statistical" references which are credited to personal communication by individual U.S. Fish and Wildlife Service personnel. Are these quotes substantiated by factual studies and/or documents? If so, we suggest that the study or document be referenced.

The protective measures recommended for Area 1 are such that oil and gas activity within this area would be precluded. It is highly unlikely that any company would expose bonus and rental dollars for a non-producible lease. Although the HE recommends no permanent facilities within Area 1, the companion Mineral Evaluation considers the possibility of support facilities located in the Camp Lonely area near Pitt Point. This is a very likely occurrence given exploration encouragement in the Western Beaufort Sea. Therefore, complete closure of Area 1, as suggested by the recommended protective measures, serves to prohibit exploration and development in that area and to severely impact the economic and safety considerations involved in exploration and production from the Western Beaufort Sea area located north and adjacent to Teshekpuk Lake Area 1.

To assume that domestic dogs may be associated with oil-producing facilities (Area 1, Stipulation 9) is highly speculative. To our knowledge there are no domestic dogs at the North Slope facilities. It seems unnecessary to include a protective measure to prohibit domestic dogs in the area.

Among the protective measures for Area 2 is verbiage dealing with the prohibition of regional transportation or utility corridors, as well as permanent airstrips or heliports. Clarification of the intent of these restrictions would be helpful. Production would necessitate an access road connecting new facilities with the Kuparuk and Prudhoe Bay area. It is also likely that an access road would be constructed adjacent to the pipelines connecting the facilities with TAPS.

The stipulations attached to past NPR-A leases are quite restrictive and should also provide adequate mitigating impacts in the Teshekpuk Lake area. We recommend that additional consideration be given to the adoption of similar lease stipulations for the study area, rather than the HE suggested protective measures.

It is also suggested that the Teshekpuk Lake Study Area be reviewed periodically (with consideration to the national economic and security significance of domestic oil and gas production) for a rebalancing of the habitat/mineral values within the area.

Additionally, we concur with the comments by the Alaska Oil and Gas Association (AOGA), which are being submitted separately.

Very truly yours,

John B. Kavanagh
Land Manager

ARCTIC AUDUBON SOCIETY
P.O. BOX 82098
COLLEGE, ALASKA 99708

June 12, 1985

Mr. Jim Silva
Bureau of Land Management
PO Box 1150
Fairbanks, AK 99707

Dear Mr. Silva:

We appreciate the opportunity to comment on the Draft Habitat Evaluation for the Teshekpuk Lake Special Area Study. Since it is important that the TLSA Phase 2 and 3 planners have available to them all relevant information as planning proceeds, the comment period is critical. We are glad to be a part of it and I especially appreciate your acceptance of our comments at this late date.

We have several concerns regarding the Habitat Evaluation (HE). They are listed below.

1. The use to be made of the HE is not clear. Hence, the reader (whether the public or the Phase 2 and 3 TLSA planners) is not clear what has been decided and what options remain. For example, on page 2, the paragraphs explaining Phase 2 and Phase 3 of the planning process imply that the decision to lease within the TLSA at all has already been made, and that the remaining decisions are only where, and with what stipulations. This is misleading. This misconception is further suggested by the omission of the possibility that all three zones could be deleted from leasing. The waterbird group's recommendation that Zone 1 and Zone 2 be totally deleted from leasing due to their critical breeding, nesting, molting and staging habitat for arctic waterfowl and shorebirds is not mentioned. The HE does not adequately present the range of options for the habitat management plan and, in fact, seems to make assumptions about the recommendations for the final plan.

2. A similar slant is revealed by the rather vague language in the Section called "Discussion - Sensitivity to Impacts" on pages 34-62. The overall impression is that we cannot predict the impacts of oil and gas exploration or development on the largest goose molting area on the north slope, or that the impact might be minimal, even though evidently the industrial development would have to be of considerable magnitude to be economically viable, and despite the fact that the waterbird group believes that impacts would be severe. This vagueness continues in the discussion of sensitivity to impacts for caribou on pages 57-63, despite the fact that little is known about the Teshekpuk Lake caribou herd. The implication is that impact could be mitigated by protective measures, even though, in the case of the caribou herd, due to a lack of background data, impacts could not be accurately measured, and we could not know if mitigating efforts were working or not. In fact, the lack of data available on the caribou herd would suggest a moratorium on industrial development until data is available. In the case of the waterbirds, all literature available should be considered in detail and with conservative reading, especially given the outstanding natural values and therefore, national interest, of the TLSA.

3. Important pieces of federal legislation, having the intent of protecting the national interest, and pertinent to the management plan for TLSA, are not mentioned in the HE. The National Petroleum Reserves Production Act, specifically developed to govern oil and gas-related activity in the NPR-A in 1976, and which mentions that special areas within the NPR-A can be deleted totally from oil and gas development, is not mentioned. Nor is the 1981 Department of Interior Appropriation Act, intended to provide for oil and gas leasing in the NPR-A, but specifying that it be in accord with the 1976 Act. It is possible that discussion of these documents would show oil and gas leasing in certain TLSA zones are precluded by this legislation. Furthermore, these pieces of legislation may preclude some uses of the TLSA, as discussed in the BLM Mineral Evaluation Status Report, for support for offshore oil and gas exploration and development.

4. Further federal legislation having the intention of protecting the natural values and therefore national interest of the TLSA is not mentioned. Congressman John Dingell's legislation to establish Teshekpuk - Utukok National Wildlife Refuge is omitted despite its considerable role in reflecting national interest.

5. There is an important discrepancy between BLM's Zone 1 and the Zone 1 of the waterbird working group. Zone 1 should include Teshekpuk Lake itself and areas to the immediate south and west. Protective measures cannot do their job if insufficient area is covered by them.

6. The point above leads to the final point. All relevant documents and data gathered in preparing the BLM draft should become part of the planning documents for successive planning phases. All public comments from scoping meetings and all recommendations from planning subgroups should be included for maximum effectiveness for future planners.

Again, we appreciate the opportunity to comment on this BLM draft HE for TLSA. With the next planning phase including all relevant documents, omitting suggestions of decisions not yet made, and presenting a balanced version of the data and research, the final habitat management plan should accomplish the purpose of such a plan, i.e., protection of the Teshekpuk Lake Special Area in the national interest.

Sincerely,

April E. Crosby
Conservation Chairperson
Arctic Audubon Society

AEC/cld
cc: David R. Cline, Alaska Regional Office,
Audubon Society

CALIFORNIA WATERFOWL ASSOCIATION

DISTRICT OFFICE
FAIRBANKS, ALASKA
JUL 2 8 37 AM '85

June 24, 1985

Mr. Mike Penfold, State Director
Bureau of Land Management
P. O. Box 1150
Fairbanks, AK 99707

Dear Mr. Silva:

The California Waterfowl Association is a statewide, non-profit organization whose principle objectives are the preservation, protection, and enhancement of California waterfowl resources and the recreational opportunities which they provide. The Association directly represents the interests of over 150,000 sportsmen/conservationists throughout the State, and indirectly represents the interests of millions of other Californians who are concerned with and benefit from these unique resources.

We have previously been in touch with your agency concerning the Teshekpuk Lake Special Area Study. This letter concerns the Draft Habitat Evaluation dated April 22, 1985. The Association strongly supports the National Audubon Society's position as outlined in their letter of June 3rd to you on this matter, and requests that the Study be modified and expanded to address these concerns.

Given the Department of Interior's commitment to dealing with the problem of population decline in Arctic nesting geese and the significance of this area to these birds, the Association believes that B.L.M. has a clear cut obligation to make every effort to maintain and improve their habitat.

Very truly yours,

Dan Chapin, Chairman
Resources Committee

cc: Donald P. Hodel
Craig Potter
David Cline
Loren Head w/encl.
Jim Tanous w/encl.
Lee Lehman w/encl.

EXXON COMPANY, U.S.A.

June 10, 1985

Re: Teshekpuk Lake Special Area
Study Habitat Evaluation

Mr. James Silva
Bureau of Land Management
P.O. Box 150
Fairbanks, AK 99707

Dear Mr. Silva:

The following comments on the Teshekpuk Lake Special Area Study Habitat Evaluation (HE) are provided to you per Jack Melior's April 22, 1985, request.

The HE seems to be based on the perception that wildlife and oil and gas uses are not compatible. As written, protective measures are proposed that would largely prevent oil and gas activities in the study area. We recognize the special biological importance of the area, but feel the proposed stipulations are unjustified. Our exploration and production experience on the North Slope, as well as elsewhere, demonstrates that through careful planning and cooperation with resource agencies, oil and gas development can take place without significant harm to the wildlife.

Since this evaluation's purpose (as stated in the Executive Summary) is to update and illustrate biological resource values, we do not believe such specific stipulations should be included. It would be more appropriate to develop performance standards at this stage which recognize both biological, and oil and gas needs. Specific stipulations would be developed, as appropriate, when permitting actions are proposed. This would provide a more balanced approach to developing management policy for this special area within the petroleum reserve.

We feel too much emphasis has been placed on personal opinion and speculation by individuals in assessing potential impacts from oil and gas activities, and in drafting proposed protective measures. We ask that where possible, opinion or speculation be replaced or supported by case history and published literature citations. Performance standards should be developed from an objective perspective to ensure that habitat needs are adequately protected without arbitrary restrictions on development needs.

A DIVISION OF EXXON CORPORATION

Mr. James Silva
June 3, 1985
Page 2

Exxon is currently exploring several offshore oil and gas prospects to the north and west of the study area. We and other members of industry have committed significant investments to obtain state and federal leases in this offshore region. Closing off the entire coastline of the study area would unreasonably jeopardize industry's ability to produce and transport any discoveries that may be made in this region.

We ask that the Bureau consider our comments carefully and that the HE be revised so that a sound, balanced management policy for the study area can be developed.

Exxon appreciates the opportunity to comment. Our specific comments are attached.

Very truly yours,

R. H. Weaver

RHW:kyn/937

Attachment

A T T A C H M E N T

EXXON SPECIFIC COMMENTS
TESHEKPUK LAKE SPECIAL AREA STUDY
HABITAT EVALUATION

Page 29, Second Complete Paragraph, Second Sentence: Surveys of snow geese on Howe Island do not indicate that this colony is declining. The island was not used for nesting in 1977, and there is some speculation that low helicopter flights contributed to this lack of use. However, the geese returned the following year and have used the island in traditional numbers ever since.

Page 30, Item (2)(a), Second Paragraph: Please delete the reference to the Howe Island breeding colony as being threatened unless this is further substantiated. See previous comment.

Page 31, First Paragraph: Please delete or substantiate the statement, "It is highly unlikely that snow geese will nest in any significant numbers if oil and gas-related activities occur in the area." Snow geese exist in the vicinity of the Prudhoe Bay, Lisburne and Endicott developments. We realize that some uncertainty may exist in determining the extent of potential impacts. However, case studies and published literature should be cited before making these types of conclusions.

Page 37, First Paragraph: The first sentence states that it is difficult to predict effects on waterbirds and their habitats from placement of an oil production facility, yet the paragraph concludes that development is "unacceptable when weighed against the almost certain displacement of molting geese." The Waterbird Discussion Panel that made this latter statement in 1982 admitted that they did not have adequate data from which to estimate impacts. Further, the panel did not look at the case history provided by other North Slope developments and did not consider the potential for geese to habituate to new stimuli in arriving at their pessimistic conclusion. Please revise this paragraph to present a more balanced viewpoint of potential impacts.

Page 37, Fifth Paragraph: We disagree that coastal wetlands (salt marshes) would be difficult, if not impossible, to maintain with large-scale development. Salt marshes could be maintained so long as access to the salt water is not blocked. This could be accomplished by locating roads and culverts to minimize disturbance to natural flow.

Page 39, Third Paragraph: To our knowledge, there is no publication which substantiates that black brant were disturbed by overflights of 1,500 feet at Izembek Lagoon. Relying on personal communication for this type of information should be minimized since the context of the reference is uncertain and untested (i.e. type of aircraft, type of disturbance, numbers involved, significance of impact, etc. are unknown).

Page 40, Second Paragraph, Second Sentence: The proposed 5,000 foot minimum flight altitude appears to be arbitrary and excessive. We note that the 1982 Waterbird Discussion Panel recommended a 1,000 foot minimum ceiling. A basis for this higher altitude should be provided.

Page 40, Item (b), Second Paragraph: We question whether the noise generated by the gas compressor simulator is indicative of noise that would be generated by oil field facilities in this North Slope region. Such facilities are enclosed and therefore significantly sound insulated.

Page 40, Item 3, First Paragraph: It should be noted that the small oil, drilling mud, and fuel spills are cleaned up and disposed of such that they do not enter the environment. This paragraph misrepresents the nature of oil field disposal practices and pollution control which accompanies industry activities. "Chronic contamination" does not occur.

Page 41, First Complete Paragraph: Toxic substances are not usually placed in reserve pits. Reserve pits discharges are regulated by the Alaska Department of Environmental Conservation and the water quality of proposed discharges must be certified in advance. Please delete this misrepresentation statement.

Page 41, Fourth Complete Paragraph, Last Two Sentences: A reference citing the active transport of contaminants between ponds over one mile apart should be provided or this allegation should be deleted.

Page 41, Item 4, First Two Paragraphs: Please point out that the direct mortality of water birds by contamination has not been a problem in the past in the State of Alaska.

Page 42, Third Complete Paragraph: We do not believe that poaching is currently or likely to become a problem. Please substantiate or delete this speculation.

Page 43, Last Paragraph: (See Comment On Page 37, Fifth Paragraph)

Page 50, Figure 10: In the final EIS for the 1983 NPR-A Lease Sale, Page 40 shows that an area to the north and east of Teshekpuk Lake comprising about one-half of proposed "Priority Area I" contains 60% of the black brant molting habitat. This smaller area would be a more appropriate highest priority region.

Page 51, First Complete Sentence: Please elaborate on, and provide a reference for, this sentence.

Page 51, Protective Measures: Please see our comments for Chapter 3 on the summary of protective measures for combined values.

Page 53, Item B.1, Second Sentence: Natural variations in caribou population are expected. Also, the variation in population of the Teshekpuk Lake caribou herd could be due to interchange with the Central Arctic caribou herd. Please acknowledge this hypothesis.

Page 58, Last Paragraph: We do not agree that placement of gravel causes a direct physical loss of habitat for caribou since they are known to freely cross roads and pads, and to use them for insect relief.

Page 59, Second Paragraph, Last Sentence: Caribou displacement from previously occupied calving areas should not be a problem because habitat is not limited.

Page 63, Item 3, First Sentence: Fuel spills, waste disposal, etc. should not pose a problem for the environment since spills are small, infrequent, and are cleaned up immediately after they occur.

Page 63, Protective Measures: (See Comments On PROPOSED PROTECTIVE MEASURES, regarding pages 100 through 103)

Page 99, First Paragraph: Although this paragraph states that the protective measures outlined in this document are the results of carefully documented studies, we would like to point out that a large degree of documentation identified in this report is in the form of personal communications with various individuals. We suggest that the final draft of this habitat evaluation concentrate on improving and expanding department references.

PROPOSED PROTECTIVE MEASURES

Page 100, Zone 1, Protective Measures: General - As acknowledged in the paragraph which precedes the proposed protective measures, oil and gas activities would likely be entirely precluded by these measures. We firmly support the need to identify and protect important habitats and wildlife populations. However, a complete prohibition of oil and gas activities over an area covering nearly half of million acres is unreasonable and excessive. Performance standards should be used to protect habitat instead of outright prohibitions. Access to this area will very likely be essential to development of oil and gas resources from already leased state tidelands and federal OCS acreage adjacent to the study area.

These measures are contrary to the initial purpose for which the NPRA was created. Sections 104 and 105 of the Naval Petroleum Reserves Production Act speak of allowing exploration in such a manner to assure maximum protection of certain biological resources, particularly geese molting grounds of the Teshekpuk Lake area. A flat prohibition of activities throughout half of million acres greatly exceeds requirements of these Sections.

Protective Measures 1 through 3: Each of these measures would prevent any development or transportation activities in a large area of potentially

175

great importance to Exxon. For instance, a pipeline across this region with an adjacent controlled access may be required to develop leases offshore from the Special Management Area. We believe such activities would not significantly impact regional brant or other important populations. Full consideration of the potential impacts of this and other activities can only be made once proposals are on the table. Economic, technical feasibility and environmental considerations should dictate permitting decisions for specific proposals. Please revise these measures to allow oil and gas development and transportation to occur where it would significantly impact important populations.

Protective Measure 4: A 5,000 feet overflight requirement seems arbitrarily high based on observed disturbance and habituation to disturbance in other areas. Please substantiate or reduce this measure. (Also, see comment for Page 49, Second Paragraph.)

Protective Measure 5: We are unaware of any precedent or justification for a winter overflight restriction. Please delete this measure unless its need is substantiated.

Protective Measures 4 and 5: Please revise these measures with the phrase "except where human safety would be compromised by this restriction".

Protective Measures 6: This restriction is unjustified and could potentially prevent development and transportation activities throughout the region.

By the Bureau's own estimate on Page 43 of the DE, the study area probably provides less than 1,000 pounds of subsistence fish to Barrow and Nuiqsut residents. Furthermore, as explained on Page 30 of the 1983 NPR-A Lease Sale EIS, there is large annual variability in the distribution of regional fishery resources. Figure 19 in the DE sketches a huge area for the traditional subsistence fishery. Given 1) the small contribution of the fishery resources to native diets; 2) the potential unpredictability on annual variability; 3) the minimal potential for any oil and gas activity to affect more that a tiny fraction of available area; and 4) the small

likelihood of any direct impacts even adjacent to oil and gas facilities, this measure seems unjustified. The impact to industry would be particularly severe if roads or pipelines would be prohibited from crossing such waterways.

Protective Measure 9: Prohibiting domestic animals could unreasonably restrict access by subsistence hunters.

Page 161, Zone 2 - Protective Measures:

Protective Measure 1: Performance standards would be a more reasonable approach than a flat prohibition of fill and excavation on Class II - VII wetlands. Such broad prohibitions are premature and unjustified.

Protective Measure 2: Please modify this prohibition on activities to allow consideration of activities during other periods when winter construction is not feasible.

Protective Measure 3: It is not clear what is meant by this proposed measure. It is not biologically justifiable to allow for in-field roads and pipelines but to not allow roads and pipelines from other areas. Wildlife would not know the difference and the impacts would be the same.

Protective Measure 4: Please revise this proposed measure to read "Unless [environmentally preferable] there is no reasonable alternative, prohibit permanent airstrips or heliports".

Protective Measure 5: Please substantiate the need for or delete this measure.

Protective Measure 7: This measure should be deleted since it will not ever apply. Developers do not construct non-essential facilities - particularly in the expensive arctic environment.

Protective Measures 9, 10, 11: See comments for potential measures 4,5, and 6 under Zone 1.

Protective Measures 12 and 13: These restrictions exceed Measure 6 for Zone 1 since they apply to all waterways and lakes instead of targeting subsistence fishery areas. As we discussed for that Measure, we believe such restrictions are excessive and unjustified. They would be particularly limiting on the North Slope since the tundra is canvassed by lakes and streams.

Page 192, Zone 3, Protective Measures: According to Chapter 2 in the DE, Zone 3 appears to have significantly lower wildlife and subsistence uses than the other zones. This zone appears to contain no bird molting areas, no current caribou calving habitat, limited native allotments (in four southeast townships), and limited subsistence use. Due to this comparatively lower wildlife and subsistence value, we believe additional protective measures are inappropriate and excessive. Protective Measures 1, 2 and 5 are the most overrestrictive and unjustified of the nine stipulations proposed for this zone.

Protective Measures 1 and 2: See comments for Protective Measures 1 and 2, Zone 2.

Protective Measure 5: See comment for Protective Measure 6, Zone 1.

Protective Measures 7 and 8: See comments for Protective Measures 4 and 5, Zone 1.

BEST COPY AVAILABLE

176

DIS[illegible] OFFICE
FAIRBANKS, ALASKA

JUN 6 1 38 PM '85

National Audubon Society
ALASKA REGIONAL OFFICE
308 G STREET, SUITE 219, ANCHORAGE, AK 99501 (907) 276-7034

June 3, 1985

Mr. Jim Silva
Bureau of Land Management
P.O. Box 1150
Fairbanks, AK 99707

Dear Mr. Silva:

These are comments of the National Audubon Society on the Draft Habitat Evaluation for the Teshekpuk Lake Special Area Study within the National Petroleum Reserve in Alaska (NPR-A) dated April 22, 1985. It is obvious that a great deal of hard work went into preparation of the draft document. We were pleased to find that it contains an excellent summary of much of the best available scientific information on renewable resource values in the study area.

The evaluation report does, however, have a number of serious ommissions. We are also very disappointed that its overall tone indicates that BLM appears committed to oil and gas leasing in all or portions of the study area whether it is justified in the national interest or not.

The Teshekpuk Lake Special Area is recognized as containing the largest and most significant congregation of molting geese in the American arctic. Furthermore, it possesses other proven nationally and internationally significant fish and wildlife values, including a caribou herd. Thus it has received both state and national recognition as having potential for inclusion as a unit in the National Wildlife Refuge System, and is one of two areas in the NPR-A that state and federal wildlife agencies and conservationists feel very strongly should not be subjected to oil and gas leasing or development of any kind. This is particularly true in light of the current "oil glut" and cutbacks in industry exploration activities throughout the nation. How then, can the BLM in any way justify encouraging oil and gas leasing in such sensitive fish and wildlife habitats under its jurisdiction where prospects for discovery of commercial quantities of oil and gas are marginal at best?

Major problems that we have identified and recommendations for addressing them are as follows:

1. **Problem**: Why was deletion from oil and gas leasing not identified as an option for all three zones within the study area to protect resource values? The Waterbird Group, for example, recommended that zones 1 and 2 should be closed to leasing since the areas are critical to breeding, nesting, molting, and staging of a rich variety of arctic waterfowl and shorebirds. Yet, the habitat evaluation does not even identify this as an option let alone include it as a recommendation.

Recommendation: Identify deletion from oil and gas leasing as an option for all three management zones within the study area.

2. **Problem**: Why is it not specifically stated that all black brant molting habitats should be closed to oil and gas leasing? Instead, the reader is led to believe that these areas may be opened for exploration with stipulations. This is inconsistent with the Record of Decision for the EIS on oil and gas leasing in NPR-A.

Recommendation: Management zones 1 and 2, particularly the high density black brant molting area in zone 1, should be closed to oil and gas leasing as the preferred option to protect this species and other migratory birds as well.

3. **Problem**: Although black brant are given pretty thorough discussion, other waterfowl including white-fronted geese, Canada geese and tundra swans are not. Waterbirds including loons and shorebirds are also neglected. Yet the study area supports populations of waterfowl, waterbirds and shorebirds at several times the density of the remainder of NPR-A.

Recommendation: A more thorough and balanced discussion of the diversity of migratory birds that inhabit the study area should be provided.

4. **Problem**: Why was the National Petroleum Reserves Production Act of 1976 and associated regulations, and the Department of the Interior Appropriation Act of 1981 not mentioned in the habitat evaluation report? These two federal laws were developed to govern oil and gas activities within NPR-A, including the authority to "...limit, restrict, or prohibit use and access to lands within the reserve, including special areas,..." to protect environmental values.

Recommendation: All relevant information relating to protection of habitat should be incorporated in the "Authority and Legislative Directives" section of the final habitat evaluation report. Pertinent sections relating to protection of environmental values in the National Petroleum Reserves Production Act of 1976 and the Department of the Interior Appropriation Act of 1981 should be given special consideration in this regard.

5. **Problem**: Why was Congressman John Dingell's legislation to establish a Teshekpuk-Utukok National Wildlife Refuge not mentioned? This legislation was submitted to Congress as recently as 1983 and, although it has not yet been passed, does in fact reflect a national interest in the area's diversity of nationally significant fish and wildlife populations and habitats.

Recommendation: Include a thorough discussion of the proposed legislation and what consequences its passage would have for the area.

6. **Problem**: Although the report acknowledges that aircraft disturbance is a potentially serious problem, especially for waterfowl and waterbirds, the draft report fails to thoroughly address species specific impacts both with and without seasonal aircraft overflight restrictions. For example, what specific actions will be taken if the Federal Aviation Administration (FAA) refuses to adopt flight restrictions over the area?

Recommendation: Expand the section on "Discussion - Sensitivity to Impacts" to include a thorough discussion of impacts of aircraft disturbace and options for minimizing such disturbances both with and without FAA regulations.

7. **Problem**: Why did BLM exclude Teshekpuk Lake itself from Area 1 by redrawing the boundary from the lake's south side to the northern shoreline? Both the U.S. Fish and Wildlife Service (FWS) and Alaska Department of Fish and Game (ADF&G) strongly recommended that Teshekpuk Lake itself should be included in Area 1 for management purposes.

Recommendation: Restore the original boundaries of Area 1 as recommended by FWS and ADF&G to include Teshekpuk Lake and adjacent lands to the south and west.

8. **Problem**: Why does BLM fail to acknowledge that very little is known regarding the Teshekpuk Lake caribou herd? For example, there is practically no published information on the herd's historic population levels and range, seasonal movement patterns, calving grounds, post calving-aggregation areas, insect relief habitats, and wintering areas. This lack of information makes it very difficult if not impossible to make management decisions regarding the impacts of oil and gas leasing on the herd's viability.

Recommendation: Acknowledge that inadequate information is available on the Teshekpuk Lake caribou herd, and that a comprehensive research program should be completed before making irreversible management decisions that could have adverse impacts on the herd and its habitats.

9. **Problem**: Why does BLM use areas and zones interchangeably in the draft report? This is confusing to the reader and it is not clear whether or not their boundaries are identical.

Recommendation: Be consistent in using either the term "area" or "zone" throughout the final report to indicate the three management sections in the study area.

10. **Problem**: Where are the specific recommendations provided BLM by various public interest groups and individuals at the series of public meetings and workshops? Ideally, all this input should have been published in a scoping document or, at the very least, summarized in an appendix to the draft evaluation report. Such information should be vitally important both to agency decision makers and to those groups and individuals who are attempting to follow the cooperative planning effort currently underway.

Recommendation: Include a scoping section in the final report summarizing principal recommendations made to BLM at all public meetings and workshops.

In conclusion, we urge the BLM to recommend as its preferred alternative that the Teshekpuk Lake Special Study Area be closed to all development at this time because of its nationally and internationally significant fish and wildlife values, and relatively limited potential for discovery of commercial quantities of oil and gas. Only at such time as oil and gas leasing is proven essential in the national interest should it be given serious consideration in the study area.

Your consideration of these concerns and recommendations is greatly appreciated.

Sincerely,

David R. Cline
David R. Cline
Regional Vice President

cc: Bill Sheffield, Governor, Sta[illegible]a
Don Collinsworth, Commissi[illegible]Department of Fish and Game
Bob Gilmore, Regional [illegible], [illegible] and Wildlife Service
Russell Peterso[illegible] Society
James Leape, Nati[illegible]ciety
Jay Hair, National [illegible]eration
Dan Poole, Wildl[illegible] Institute, Ducks Unlimited
Dan Chapin, Cal[illegible] Association
Buff Bohlen, Wor[illegible]Fund
Jack Berryman, Int[illegible]ational Association of Fish and Wildlife Agencies
Harold Sparck, Nunam Kitlusisti
Alaska Audubon Chapters
Alaska Conservation Organizations

BEST COPY AVAILABLE

Northern Alaska Environmental Center
218 Driveway
Fairbanks, Alaska 99701
(907) 452-5021

JUN 12 7 49 AM '85
FAIRBANKS, ALASKA

June 7, 1985

Jim Silva
Bureau of Land Management
1541 Gaffney Road
Fairbanks, Alaska 99703

Dear Mr. Silva:

The Northern Alaska Environmental Center has several comments and concerns with the draft Habitat Evaluation for the Teshekpuk Lake Special Study Area. Overall, we feel the draft contains a good summary of the special wildlife habitat values of the Teshekpuk Lake area. Many of the special stipulations proposed to protect wildlife populations and habitat from oil and gas exploration and development are excellent and we strongly support them.

In comparing the maps and recommendations of the draft Habitat Evaluation and the draft Mineral Evaluation it is obvious that there are major conflicts between protection of wildlife resources and extraction of oil and gas. When the study team prepares leasing recommendations later this fall, we urge BLM to bear in mind that the wildlife resources of the Teshekpuk Lake region are of worldwide significance, and thus of paramount importance.

With the international significance of the Teshekpuk wildlife resources well documented, we feel that the Habitat Evaluation should include an option of deleting the entire special study area from oil and gas leasing. This is particularly appropriate with the current abundance of oil reserves and cutbacks in industry exploration efforts.

An obvious deficiency of the Habitat Evaluation is establishing the boundary between zones one and two at the north edge of Teshekpuk Lake. In order to adequately protect the Teshekpuk ecosystem this boundary should be drawn at the south edge of the lake to include the entire lake in zone one.

To remain consistent with the Record of Decision for the EIS on oil and gas leasing in NPR-A, the Habitat Evaluation should specifically state that all black brant molting habitats are closed to all oil and gas exploration. The report should also provide a more thorough, species specific treatment, of problems associated with aircraft disturbance of waterfowl and waterbirds. The plan should include alternative mechanisms for dealing with aircraft disturbances in the event that the FAA fails to adopt BLM recommended flight restrictions.

---

(2)

The draft could be improved by giving a more thorough discussion on shorebirds, waterbirds and waterfowl other than black brant geese. As documented in the draft report, populations of these birds in the Teshekpuk area are several times the density of those found in the remainder of the NPR-A.

We urge BLM to strictly protect the internationally significant wildlife values of the Teshekpuk Lake Study Area. To accomplish this important objective it will be necessary to delete the present zones one and two from all oil and gas leasing and carefully control leasing in zone three. This is the only feasible alternative to protect wildlife resources in this sensitive area.

Thank you for this opportunity to comment.

Sincerely,

Randy R. Rogers

Randy R. Rogers
Executive Director

cc: Mike Penfold, State Director

NORTHCOAST WATERFOWLERS ASSOCIATION
P.O. Box 476
Eureka, CA. 95502

JUN 12 '85
BLM ALASKA

MIKE PENFOLD
STATE DIRECTOR BLM
701 C ST.
ANCHORAGE, ALASKA 99513

MR. PENFOLD:

IT HAS COME TO OUR ATTENTION OF A STUDY BY BLM THAT WOULD COMPARE BIOLOGICAL VALUES OF THE TESHEKPUK LAKE AREA WITH GAS AND OIL POTENTIAL FOR THE PURPOSE OF LEASES FOR EXPLORATION AND FIELD DEVELOPMENT. AS WE UNDERSTAND IT BLM IS SEEKING INPUT OF OPINIONS AND FACTS FROM THE PUBLIC AS WELL AS GOVERNMENTAL AGENCIES. HOPEFULLY A LETTER FROM A CONCERNED GROUP IN CALIFORNIA MIGHT HELP SHOW THE RANGE OF THE SIGNIFICANT IMPACT OF THIS PROPOSAL.

NORTHCOAST WATERFOWLERS IS A NON-PROFIT ASSOCIATION, DEDICATED TO THE CONSERVATION OF WATERFOWL, WATERFOWL HABITAT, AND WATERFOWL HUNTING. WE REPRESENT THE WATERFOWL CONSERVATION CONCERNS OF THE NORTHERN COASTAL AREA OF CALIFORNIA. OUR GROUP CONSISTS OF HUNTERS, ARTISTS, HISTORIAN'S, BIOLOGIST'S, WILDLIFE STUDENTS, AND OTHER WILDLIFE EXPERT'S. WE ARE CONSTANTLY WORKING WITH, U.S.F.W., CALIF. FISH AND GAME, CALIF. PARKS, THE PACIFIC FLYWAY COUNCIL, DUCKS UNL., CALIF. WATERFOWLERS AND FEDERAL, STATE AND LOCAL ELECTED OFFICIALS. I MENTION THE ABOVE TO SHOW WE ARE A SERIOUS GROUP WITH EXPERIENCE AND KNOWLEDGE COMMITED TO PRESERVE OUR WATERFOWL HABITAT AND FRAGILE WATERFOWL POPULATIONS.

IN THE LAST TEN YEARS WE HAVE WITNESSED THE GREATEST DECLINE OF A NUMBER OF WATERFOWL SPECIES EVER RECORDED. IN THE LAST FIVE YEARS THE PACIFIC BLACK BRANT, THE CACKLING CANADA GOOSE, THE WHITE FRONT GOOSE AND THE PINTAIL DUCK POPULATIONS HAVE PLUMMETED TO SUCH LOW NUMBERS AS TO WARRANT A CLOSED OR REDUCED LIMIT.

THESE BIRDS ALONG WITH OTHERS DEPEND ON THE TESHEKPUK LAKE AREA. THIS AREA AND IT'S PRIME HABITAT OFFERS A DEVIATION FROM THE DRY AND DRAINING AREA'S OF CANADA THAT WE CAN'T CONTROL. THOUSANDS OF BRANT MOLT HERE AND WHAT GEESE AND DUCKS NEST AND BREED HERE. THE ALASKAN CARIBOU AND OTHER WILDLIFE LIVE AND BREED THERE. TO UPSET THIS BALANCE OF NATURE AND WILDLIFE WITH PEOPLE AND MACHINES COULD BE DEVASTATING.

NORTHCOAST WATERFOWLERS ASSOCIATION
P.O. Box 476
Eureka, CA. 95502

P2

U.S.F.W. ALONG WITH CALIF. WATERFOWLERS ASS. HAVE MET WITH THE NATIVE ALASKAN TRIBAL COUNCIL AND AGREED ON A MODIFIED HARVEST SEASON FOR BOTH THE NATIVE TRIBES AND THE SPORT HUNTERS OF AMERICA. THIS ALONG WITH THE EFFORTS OF DUCK'S UNLIMITED IN LEASING LAND IN CANADA AND RESTORING IT TO A WETLAND STATE WILL AND HAS IMPROVED THE POPULATION AND HABITAT BASE BUT THIS IS A SLOW AND COSTLY PROCESS. HOW CAN WE JUSTIFY OUR PLEAS TO THE PEOPLE OF CANADA, THE NATIVES OF ALASKA, AND THE PEOPLE OF AMERICA TO PRESERVE HABITAT WHEN ONE OF OUR OWN FEDERAL AGENCIES MAY ELECT TO DESTROY ONE OF THE MOST INTERNATIONAL SIGNIFICANT, PRIME HABITAT AREAS LEFT TODAY.

WE KNOW THAT WILDLIFE AND INDUSTRY ARE INCOMPATIBLE. THE INFLUX OF WORKERS WITH THEIR EQUIPMENT, THE AIR, LAND AND WATER POLLUTION THAT FOLLOWS, AND ALL THE DIFFERENT TRANSPORTATION MEANS WOULD HAVE A DISASTROUS EFFECT ON NESTING AND MOLTING WILDLIFE.

AS YOU MIGHT GATHER FROM THIS LETTER BY NOW THAT THE WATERFOWLERS OF NORTHERN CALIFORNIA ARE STRONGLY OPPOSED TO ANY OIL OR GAS RELATED ACTIVITY IN THE TESHEKPUK LAKE AREA. WE URGE YOU TO CONSIDER THE PLIGHT OF TESHEKPUK'S WILDLIFE TODAY IN YOUR PROPOSAL. ARE A FEW THOUSAND GALLONS OF OIL REALLY WORTH OUR WILDLIFE OF TESHEKPUK? IN TWENTY YEARS WE PROBABLY WILL BE USING AN ALTERNATIVE SOURCE OF ENERGY AND WISHING WE WOULD HAVE DONE MORE TO PRESERVE OUR WILDLIFE OF YESTERYEAR.

IF THERE IS ANYTHING WE CAN DO TO HELP PLEASE CONTACT US, AND PLEASE, SEND US ANY INFORMATION OR DECISIONS YOU MAY HAVE.

THANK YOU,

ROGER READ
PRESIDENT NORTHCOAST
WATERFOWLERS

CC
U.S.F.W.
CALIF. WATERFOWLERS
NATIVE TRIBAL COUNCIL
D.U.
WATERFOWLERS WORLD

BEST COPY AVAILABLE

SOHIO ALASKA PETROLEUM COMPANY

June 3, 1985

Mr. Jim Silva
Bureau of Land Management
P. O. Box 1150
Fairbanks, Alaska 99707

Re: Teshekpuk Lake Special Study Area
Draft Habitat Evaluation

Dear Mr. Silva:

Sohio Alaska Petroleum appreciates the opportunity to comment on the Teshekpuk Lake Special Study Area Draft Habitat Evaluation and commends the Bureau of Land Management on its thorough evaluation of the special study area.

As an operator of the Prudhoe Bay and Duck Island Units and for numerous exploration ventures in Alaska, Sohio has demonstrated its commitment to continued evaluation and development of Alaskan resources. As such, we urge BLM to provide flexibility for lease operations in the study area and to make provision for access across the area.

Sohio participated in the Alaska Oil and Gas Association (AOGA) review of the Habitat Evaluation (HE) and endorses comments provided by the Association. Sohio's specific comments on the document are attached; our general comments follow:

Compatibility of Oil and Gas Activities and Wildlife

There is no support for the assumption that wildlife cannot coexist with oil and gas activities. The Central Arctic caribou herd has grown, despite oil and gas development at Prudhoe Bay and Kuparuk. The snow goose colony has increased in the Howe Island/Duck Island area despite increasing activities in that area.

"Crucial" Habitat

Throughout the HE, the authors refer to "crucial" habitats without providing a clear explanation as to how this determination was made. The text suggests that if any activities occur within areas termed crucial that certain species will no longer utilize these areas. The discussions do not, however, demonstrate that these habitats limit the population size of any of the species discussed, nor does the text point out that any of these habitats are in short supply in the region. The word "important" should replace the word "crucial" throughout the discussion to more accurately reflect the value of these habitats to wildlife.

Protective Measures

Many of the proposed protective measures would preclude leasing and development in Zones 1 and 2 of the study area. Although the evaluation does not demonstrate incompatibility of fish and wildlife utilization and oil and gas development, severe constraints have been recommended for these industrial activities. We believe that protective measures proposed for Zone 3 are more than adequate to protect renewable resources within the study area.

Further, the restrictive nature of these measures is inconsistent with TSLA management goals and objectives which require identification of specific measures to protect biological and subsistence valued from oil and gas activities resulting from leasing in the area.

Regional Impacts of Study Area Management

The HE does not consider the regional impacts of land management schemes in the TLSA. In addition to placing serious constraints on hydrocarbon discoveries within the TSLA, the plan prohibits construction of any permanent facilities in Zone 1 and precludes development of transportation or utility corridors in Zone 2. Although the TLSA mineral evaluation suggests that offshore pipelines would be the preferred route for transport of production of offshore production to the TransAlaska Pipeline System, we find this assumption to be very unrealistic. The strategic position of TSLA with respect to potential offshore petroleum development in the Western Beaufort Sea should be addressed in detail by this study. The potential costs of the very restrictive development stipulations are potentially much greater than implied in the analysis.

In this evaluation, BLM recognizes the differences between passive structures (pipelines) and developments which require continual attendance (drilling, oil and gas production), but fails to recognize that passive structures which are constructed during the winter months will have little, if any, effect on summertime habitat utilization. The HE has not provided a technical justification for the prohibition of

---

onshore pipelines which may be the most economically and technically viable transportation alternatives.

We recommend that the authors re-evaluate the proposed protective measures to consider regional implications of the management scheme.

Unpublished References

A large body of literature has been developed which discusses wildlife utilization of North Slope habitats and the interrelationship of oil and gas exploration activities and wildlife. Authors of the evaluation have selected personal communication references rather than drawing on available literature. These references should be replaced, to the extent possible, with published sources.

Sohio appreciates the opportunity to comment on the Habitat Evaluation. If we can provide additional information, please contact me.

Sincerely,

R. C. Herrera, Manager
Exploration, Lands, and Environment

RCH:SAD

SOHIO ALASKA PETROLEUM COMPANY
SPECIFIC COMMENTS
ON THE
TESHEKPUK LAKE SPECIAL AREA STUDY
DRAFT HABITAT EVALUATION

1. Page 14, paragraph 3, first 1. The use of the word "crucial" is inappropriate. See general discussion regarding use of this ill-defined terminology. This term appears throughout the text and should be deleted or replaced, with the word "important".

2. Page 9, paragraph 1. This paragraph suggests that "additional site-specific stipulations would be identified after future development areas are considered in relation to wildlife use in the area." Because the costs of complying with these stipulations is factored into lease bids, it is extremely important to the oil industry that all stipulations which might be applied to exploration and production operations be identified prior to each lease sale. Additional stipulations should be applied only if the NPR-A planning team were to identify new information that was not available at the time the decision to lease was made.

3. Page 26, paragraph 3, second sentence. This paragraph discusses sport hunting of Canada geese and states that "The harvest of white-fronted geese in the Central Flyway averaged over 46,000 birds during 1971-80." Page 24 estimates the total population of Canada geese at 136,000. Is one-third of the population killed by hunters each year? Or, were approximately 4,600 birds killed each year? Please clarify this sentence.

4. Page 29, paragraph 3. This paragraph notes that fewer snow geese have been seen in recent years. The source of this information, however is Derksen's 1981 report. Johnson, Troy, and Cole (1984) summarized the work of other investigators on the Howe Island snow goose colony. A copy of this report is attached. The population data suggests that short-term perturbations may result in loss of snow goose populations within a restricted area, but that the population has the capacity to recover. A copy of the complete draft report is attached.

5. Page 32, paragraph 1, second sentence. This sentence says that "The TLSA has the potential for re-establishment of viable nesting colonies of snow geese if left undisturbed. It is highly unlikely that snow geese will nest in any significant numbers if oil and gas-related activities occur in the area." There is insufficient data to support this conclusion. Refer to comment 4., above.

6. Page 34, paragraph 1. The discussion regarding use of large lakes as airstrips during winter activities concludes that "It may not be worth while to risk any contamination of large lakes used by molting geese and other waterfowl." It should be noted that any spillage of fuels or drilling muds on frozen lakes could easily be cleaned up since these materials would be trapped in the snow on the surface of the ice. Procedures which preclude storage of these or other potentially harmful materials on any lakes are adequate to protect lakes from contamination.

7. Page 37, paragraph 3. Maintenance of salt marshes can be accomplished within the design constraints which would be placed on development.

8. Page 41, paragraph 2. Toxic substances are not typically placed in reserve pits. Such substances are handled in compliance with Resource Conservation and Recovery Act regulations.

9. Page 41, paragraph 3. Specific information should be provided to support the statement that "21 pit discharges violated one or more effluent standards." Additional information should describe the variations from water quality in order to place their potential harm to the environment within perspective. Further, road oiling operations are conducted under a Department of Environmental Conservation permit which requires reporting of quantities of fluids placed on the roads. The final sentence of this paragraph should be revised to read "These statistics indicate the potential for toxicity problems arising within waterbirds and/or the habitats they utilize."

10. Page 41, paragraph 5. This paragraph discusses potential contamination from reserve pits and utilizes a personal communication from a U. S. Fish & Wildlife Service employee to support the statement that "Reserve pits are devoid of aquatic invertebrates and adjacent ponds are extremely low in species diversity. Even ponds approximately one mile from reserve pits in the Prudhoe Bay region have a reduced diversity of aquatic invertebrates." This statement must be supported by quantitative, published data or deleted from this evaluation.

11. Page 42, paragraph 2. I am unaware of any domestic dog which has been attracted to oil-producing facilities on the North Slope.

12. Page 42, paragraph 3. Poaching has not been a problem at North Slope oil-producing facilities. Because of relatively full work days, lack of availability of cooking and storage for game, it is unlikely to become a problem in the future.

---

13. Page 42, paragraph 4. The Teshekpuk Lake Study area should not be described as "unique." It's use by large numbers of migratory waterfowl does make it internationally significant, but there are similar wetlands along Alaska's northern coast.

14. Page 43, last paragraph. There is no justification for the statement that "It is doubtful that construction of an oil development or port facilities and associated roads can be accomplished without severely impairing the habitat characteristics of these wetlands." By applying sound engineering practices, a facilities may be designed which would be compatible with the hydrologic properties of salt-influenced wetlands.

15. Page 50, first complete sentence. There is no technical justification for the statement that "It has been demonstrated that black brant and other goose species during molting and staging are incompatible to even low levels of human activity." This statement should be supported by an appropriate published citation or deleted.

16. Page 51, middle of first paragraph. There is no justification for prohibiting permanent facilities in these lands. The level of impact is related much more closely to the type of activity at the site rather than to its permanence.

17. Page 51, Protective Measures (Area 1).

The measures described would preclude leasing in the area. These measures are inconsistent with TLSA management goals and objectives which require identification of specific measures to protect biological and subsistence values from oil and gas activities resulting from leasing in the area. The goal of the study was to minimize the potential impacts of leasing, not to preclude leasing altogether.

The measure which would require aircraft to maintain an altitude of 5,000 feet above ground level is not justified by the technical evaluation. Further, persistent ground fog along the coastline would preclude VFR flights over the area. The guideline that flight altitudes of 1500 feet be maintained unless weather conditions dictated otherwise has successfully minimized the effects of air traffic to waterfowl in other operating areas. A similar requirement should be applied here.

18. Page 51, Protective Measures (Area 2).

By limiting placement of fill to Class I wetlands, development of any sort is precluded. Because wetland types are interspersed, no gravel pad or road could be placed without impinging to some extent on several other wetland types.

Best technology may dictate that a regional transportation corridor cross the study area lands. Since it has not been demonstrated that passive structures (such as pipelines) would have a serious effect on wildlife utilization of the study area, their construction should not be prohibited.

If development is to occur, permanent airstrip or heliport may be required. These measures should not preclude orderly development of the region.

See earlier comment on overflight restrictions.

19. Page 52, Protective Measures (Area 3)

The measures provided for this area should be extended to all areas. With the exception of the arbitrary construction season, the guidelines provide for maximum protection of the environment while allowing for oil and gas exploration and production. Restrictions applied to all oil and gas activities, including construction, should allow flexibility dependent upon site-specific conditions.

20. Page 56, end of paragraph 2. We have some difficulty with the statement that "These additional areas, if any, may prove to be as important to the existing population as any that have already been identified." In preparing bids for leases in any area, potential lessees evaluate expected lease stipulations in order to project overall exploration and development costs. If there is uncertainty as to the extent of restrictions which might be placed on oil and gas activities, potential lessees will face the difficult task of projecting costs associated with open ended environmental stipulations.

21. Page 60, paragraph 2. While the airstrip at Umiat may have provided a staging center for hunters, this information should be documented and quantified. It is insufficient to say that "many moose and caribou hunters [use the airstrip] as a major access point."

22. Page 61, paragraph 2. It should be noted that low flight sightseeing associated with oil and gas operations has been prohibited in other areas along the Beaufort Sea coast (see page 5, The Beaufort Sea Environment: A Briefing Program for Supervisors, attached), and similar practices would be extended to operations in NPR-A.

23. Page 63, paragraph 3. Environmental contamination from oil and gas exploration and development activities would not be a significant problem. Operations are routinely conducted in accordance with Federal, State and local regulations and sound operating practices.

These practices include preparation of SPCC plans for facilities, provision for secondary containment, disposal of wastes within site specific permit conditions, and prompt reporting and cleanup of any spill. Under these operating conditions, the potential for environmental contamination is minimized to the greatest extent possible.

24. Page 63, paragraph 5. There is no technical justification for the conclusion that "pregnant cows and cows with calves would not be compatible with a major oil and gas development complex." Caribou do calve in and adjacent to the Prudhoe Bay and Kuparuk oil fields. There is no reason to expect this herd to behave differently.

25. Pages 63-65, Protective Measures (Caribou in all areas). See comments 16-19. There is inadequate justification for prohibition of permanent structures in the study area, nor for implementing seasonal closures or overflight restrictions which would preclude leasing and development. The recommendation for Area 3 which suggests that a management plan be developed should be sufficient to protect caribou throughout the study area.

26. Page 69, paragraph 5. We appreciate BLM's recognition that too many social scientists have conducted surveys in Nuiqsut and commend the agency for establishing limitation of intrusions to the village as a goal.

27. Page 81, section (b). BLM should note that potential contamination of fisheries resources is limited to a great extent by regulations and permit stipulations which apply to oil and gas operations.

28. Page 82, paragraph 4. To preclude dewatering of fish overwintering areas, it is standard practice to select fish-free lakes as water sources.

29. Page 99, paragraph 5. References should be provided in support of the statement that "Recent observations have documented that during molting and staging . . . black brant and other geese are disturbed by even low levels of human activities." Earlier portions of the text describe brant avoidance of human activities in wintering areas, but do not provide similar data collected during the summer months.

30. Pages 100-103, Protective Measures. See comment 25 above.

31. Page 106, paragraph 2. Given the level of experience in drilling for oil and gas in offshore Alaska and in near shore wetlands, it would seem that there is sufficient knowledge regarding the interaction of drilling and fisheries.

BEST COPY AVAILABLE

Sohio Alaska Petroleum Company
Specific Comments on the
Teshekpuk Lake Special Area Study
Draft Habitat Evaluation
Page 4

32. Page 104, paragraph 4. How would a study of historic reindeer herding within the TLSA serve to protect subsistence uses and wildlife populations?

Attachments:

Johnson, S. R., D. M. Troy and J. C. Cole. April, 1985. The Status of Snow Geese in the Endicott Development Unit, Sagavanirktok River Delta, Alaska: A 3-Year Report. LGL Alaska Research Associates, Inc. for Sohio Alaska Petroleum Company, Anchorage, Alaska.

Lawhead, C. S., and S. M. Taylor. The Beaufort Sea Environment: A Briefing Program for Supervisors, OCS Lease Sale 71.

May 31, 1985

TESHEKPUK LAKE SPECIAL
AREA STUDY
HABITAT EVALUATION

Mr. Jim Silva
Bureau of Land Management
P. O. Box 1150
Fairbanks, AK 99707

Dear Mr. Silva:

We at Texaco appreciate the chance to comment on the Habitat Evaluation of the Teshekpuk Lake Special Area, especially as we own leases within and adjacent to TLSA which were granted by BLM.

As a general comment, it appears that BLM intends to impose severe restrictions on any further oil and gas activity in TLSA, despite the fact that such activity has proceeded intermittently without detectable harm since about 1949. In the case of our existing leases within the area, these new restrictions would amount to a unilateral alteration of the lease contract between BLM and Texaco, and we believe this is wrong.

On P. 34, under No. 4 (Sensitivity to Impacts) a.(1)(a), the authors state "There may be some effects on the vegetation mat [from winter cross-country transportation], and although the effects are thought to be minimal...., long-term effects on wetland habitats are not completely understood." Given the fact that oil and gas exploration operations have been conducted in this region since 1949, it would appear that a great deal should now be documented on the long term effects on wetlands, at least over the past 36 years. We suggest that 36 years can be considered as long-term, and if the effects of that old activity are not now understood, they never will be.

Again, on P. 35, same heading, we read "Improper cross-country travel can have a myriad of effects and examples of past adverse impacts exist throughout the North Slope." Apparently BLM considers any impacts on wetlands from vehicular traffic as adverse, although it is our impression that probably 90% of this adversity is visual and esthetic, rather than physically harmful. Certainly natural physical processes duplicate and usually far surpass the effects of travel, but the difference is that nature doesn't as often operate in straight lines or parallel tracks. We suggest that the biological population of the North Slope is perfectly at ease with and thriving within those "past adverse impacts" areas.

Mr. Jim Silva
May 31, 1985
Page Two

On P. 35, under (b) Exploratory Drilling, drilling muds are casually lumped together with other "toxic substances" which may contaminate wetlands. There are mountainous collections of studies, tests, bioassays, and testimony that show drilling muds to be virtually non-toxic. This should be acknowledged.

Under (1) Alteration of Habitats on P. 37, we see "Coastal wetlands are maintained by periodic influx of salt water during storm tides. This effect will be difficult if not impossible to sustain with any large-scale development of facilities in these areas." We can count about 100 miles of coastline along the north side of TLSA. Are you suggesting that enough facilities are going to be crowded along the coast to jeopardize influx of salt water to wetlands? With even an intensive development complex, it is difficult to visualize more than an additional 5% of the coastline being affected, and even then it is certain that mitigating measures would be insisted upon.

Thank you again for the opportunity to comment.

Very truly yours,

D. C. HARTMAN
Advanced Exploration Land Representative

DCH:bjs

02/43

DISTRICT OFFICE
FAIRBANKS, ALASKA
JUN 25 1 30 PM '85

THE WILDERNESS SOCIETY

June 20, 1985

Mr. Jim Silva
Bureau of Land Management
P.O. Box 1150
Fairbanks, AK 99707

Re: Draft Habitat Evaluation and Status Report on the Mineral Evaluation for the Teshekpuk Lake Special Area Study

Dear Mr. Silva:

On behalf of its 140,000 members nationwide, The Wilderness Society appreciates the opportunity to comment on the draft Habitat Evaluation and Status Report on the Mineral Evaluation for the Teshekpuk Lake Special Area within the National Petroleum Reserve-Alaska.

The Teshekpuk Lake Special Area is renowned as one of the most biologically productive, diverse and sensitive wetland ecosystems in arctic Alaska. For this reason, the United States House of Representatives has twice passed legislation to include the area in the National Wildlife Refuge System. As recently as last Congress, such a bill was introduced in Congress, emphasizing the national significance of the area for wildlife. Congress also demonstrated its concern about the area by according it heightened protection in the context of the Barrow Gas Field Transfer Act. Yet the study does not acknowledge the area's considerable legislative history.

The draft Habitat Evaluation contains one major flaw that casts a shadow over the entire study. It assumes that some oil and gas leasing will take place in the Special Area as evidenced by the fact that not leasing was not identified as an alternative for the whole area. The purpose of the report should be to determine whether or not leasing should occur at all. The result of this inappropriate orientation is that the study attempts to justify that preconceived notion and to set out methods to mitigate the inevitable damage that would ensue from oil and gas exploration and development. Toward this end, the Bureau of Land Management (BLM) selectively used the literature that supports the desired conclusion. The report also tries to whittle down any no leasing area to the smallest possibly justifiable. This is simply the wrong approach to take in this delicate and critical habitat.

ALASKA REGION
519 WEST 8TH AVENUE, SUITE 205, ANCHORAGE, ALASKA 99501
(907) 272-9453

The report is intended to be the product of a cooperative effort with the U.S. Fish and Wildlife Service (FWS) and the State of Alaska. What was the nature of that cooperation? What were the recommendations of FWS and the Alaska Department of Fish and Game? The missions of these agencies are primarily the management of wildlife as opposed to the multiple-use mandate of BLM. Hence their recommendations should be given great weight in any decisions affecting the incomparable wildlife values of Teshekpuk Lake. The public must be informed of their important contributions to the study and their recommendations. In fact, all public and agency comments should be published in their entirety in the final report.

All of the Teshekpuk Lake study area should be put off limits to oil and gas leasing. Studies have shown that a considerable buffer zone is necessary to protect, for example, populations of black brant. Considering the tenuous status of this species, extréme caution must be the order of the day in any actions that could affect them. Furthermore very little is known about the Teshekpuk Lake caribou herd. Yet decisions are being proposed that could have irreversible impacts on the herd and its habitat.

Have the consistency provisions of the Coastal Zone Management Act (CZMA) been activated? If not, the State should be included pursuant to the CZMA at this time. Leasing starts a process that can lead to development. Therefore leasing is the appropriate stage for a coastal zone consistency determination.

The Wilderness Society is greatly concerned about the Teshekpuk Lake Special Area as an area of enormous national and international significance. Its biological importance and its extreme sensitivity make it difficult to imagine how oil and gas exploration and development could be conducted in a compatible manner. Therefore the Society urges BLM to take steps to delete the entire area from its oil and gas leasing plans.

Sincerely,

Susan Alexander

Susan Alexander
Regional Director

cc: Mr. Michael Penfold, State Director, BLM
Mr. Robert Gilmore, Regional Director, FWS
Mr. Don Collinsworth, Commissioner, ADF&G

P O Box 82995
College AK 99708
28 May, 1985

Mr. Mike Penfold, [illegible]
Alaska State Office
Bureau of Land Management
Anchorage AK 99513

Dear Mr. Penfold

I am concerned that Teshekpuk Lake receive the protection it deserves as a wildlife habitat significant to the future of wildlife — the [illegible]

[illegible]

I have been [illegible]

Sincerely [illegible]

Box 1513
Juneau AK 99802
May 25, 1985

Dear Mr. Penfold

For many decades I've been working for protection of key North wildlife habitat areas. [illegible] the Teshekpuk Lake special area [illegible] black brant. [illegible] regulations.

Please keep me informed on the decisions being made [illegible] that may become available. Thank you.

Sincerely
Robert J. [illegible]

APPENDIX VI

MAPS - 1:250,000

Land status - No. 1

Waterbirds - No. 2

Caribou - No. 3

Subsistence - No. 4

END

09.19.86